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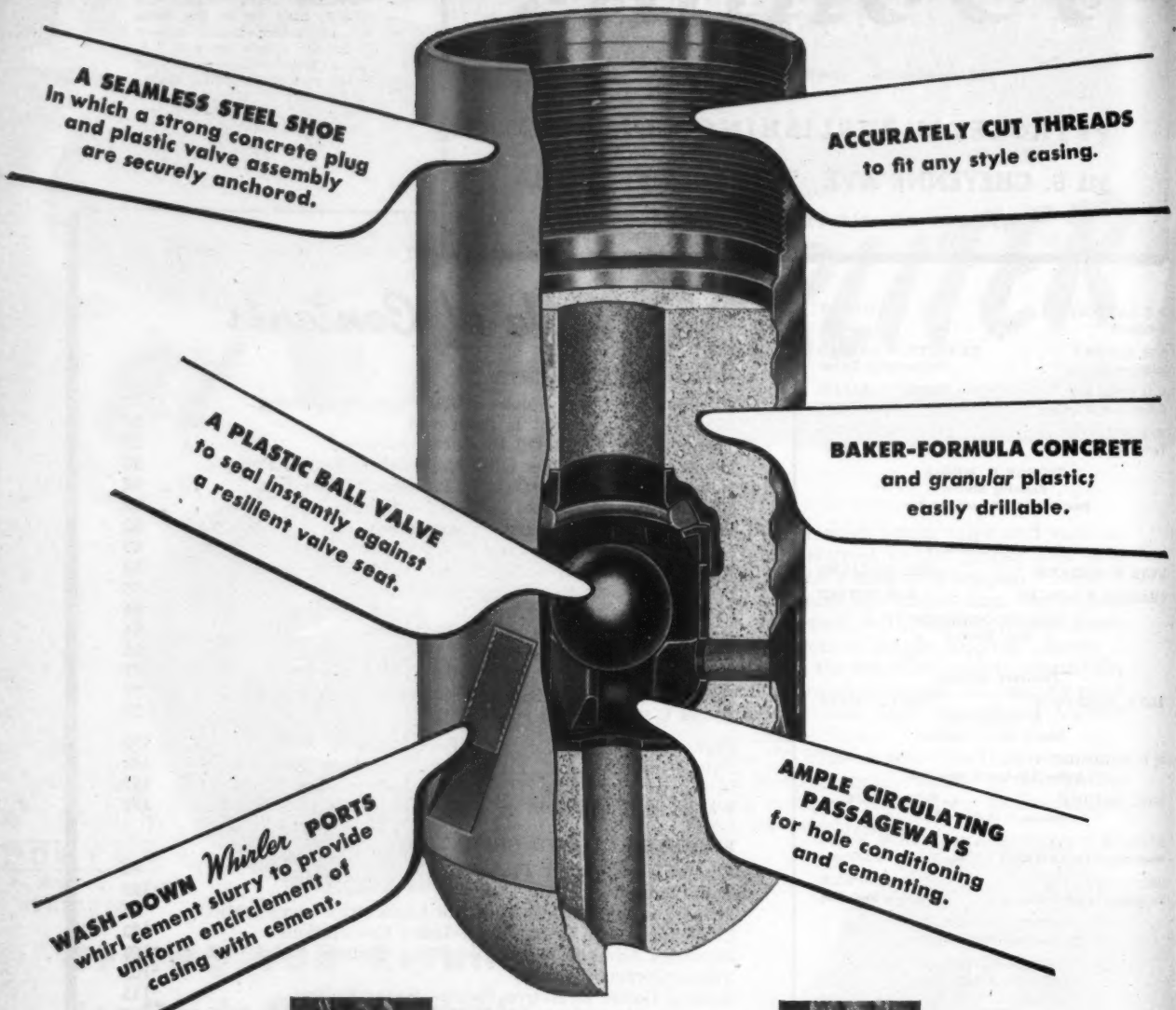
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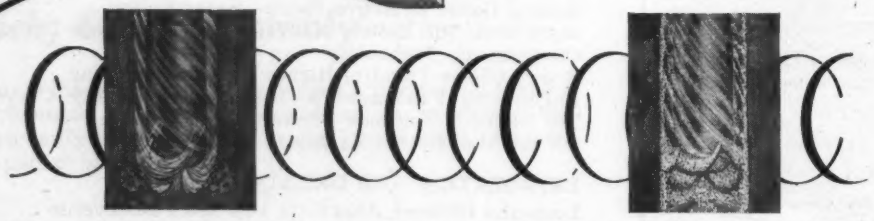

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THE OIL AND GAS JOURNAL

A Promise Kept

AS we pass the third anniversary of V-J Day, evidence is accumulating that the oil industry has fulfilled its postwar promise to devise means to offset the effects of the enforced war curtailments, and to supply the amazing increases in peacetime demands.

That domestic supplies have caught up with consumption is clear from a statistical analysis in this issue, marking the culmination of a trend which has been under way since early spring. The peak summer gasoline demands will end on Labor Day with substantially greater stocks than a year ago, and inventories of intermediate and residual oils appear adequate to back up production over the next several months of maximum consumption.

As to what this means, there are already many indications in domestic activities. Premium prices for products in spot sales are disappearing. The great bulk of petroleum products in this country move from refineries to wholesale and retail outlets through long-term agreements, thus assuring an orderly merchandising procedure. Over the past 2 years, because their contracts did not fully cover their mounting requirements, many companies were forced to make supplementary purchases at prices above the going markets. A sustained balance in supply and demand will mean that this phase of marketing will no longer be necessary.

A return to normal market conditions will bring changes in refinery operations. The postwar markets have been largely dominated by the tremendous gains in consumption of oil as heating and diesel fuel. To supply these demands there have been sacrifices in plant efficiency. A gradual return to conditions which again emphasize maximum yields in gasoline, normally the "money product," is now in prospect.

Costly makeshifts in transportation to get the crude from the fields to the refineries have been necessary, including the use of railroads with their high rates. Crude-oil pipe-line programs will end these practices.

In production if there are fields producing in excess of MER, that practice can also end. Aside from MER, there are operators who will welcome the opportunity to lower output in certain fields to the end that they can build up reserves to be produced over a long period.

Today's statistical position is not to be interpreted as assuring answers to all supply problems over an indefinite period. Large-scale expansion and rehabilitation programs in all operating divisions in this and other countries extending over a period of several years will have to be completed in rounding out postwar petroleum activities.

But the immediate objective has been accomplished as operators said it would if they were left to their own devices. The Washington oil investigators, looking for something with which to confuse the public and cover up incompetence in Government, won't like it—but the industry's customers and the entire world economy will.

Oil Shortage Over; Figures Show Stocks of All Products Gaining

by John C. Casper

THE oil shortage is over. There is plenty of gasoline for the remainder of the touring season and there will be ample supplies of heating oil in all parts of the country next winter.

Analysis of industry statistics made by The Oil and Gas Journal shows that the production of petroleum products not only has caught up with the unprecedented postwar demand but is running so far ahead of current consumption that stocks are building up rapidly. The present rate of stock increase promises a comfortable margin of safety for months to come.

As shown in the chart on this page, stocks of the four major products—gasoline, kerosine, distillate heating oils, and residual industrial fuel—have increased faster during the last four months than during any corresponding period in a decade.

Stocks are the key to the supply situation. So long as products went almost literally from refinery to consumer there was no chance for distributors to build up inventories. Distribution was uneven and there were local and regional shortages.

The present stock picture is not a temporary or fleeting phenomenon. It is a long-range trend, which has been in progress for months. The daily average stock increase during April, May, June, and July of this year was 2.8 times that of the same period last year. It was 1.9 times that of the same period of 1946. It was 3.4 times that of the same period of 1939.

Gasoline Proved Ample

Last spring motorists were worried lest they run short of gasoline on vacation trips. On July 31, with much of the high-demand season over, stocks of gasoline at refineries and bulk stations were 13,113,000 bbl. greater than on the same date last year—an increase of 15.2 per cent. This is in spite of the fact that consumption of gasoline so far this year has been running about 8 per cent higher than 1947. During the third quarter of this year the demand for gasoline will be 7.6 per cent greater than last year, according to the forecast carried in detail in The Oil and Gas Journal of July 29, page 174.

Kerosine, which gave trouble the past two winters, looks good as of this date. Stocks are 19.3 per cent higher than last year and the forecast for consumption during the 6 winter months is 12.1 per cent above the use during the 1947-48 winter.

Stocks of distillate fuel oils on July 31 were 22 per cent (10,217,000 bbl.) above the same date last year. Winter demand is forecast at 11.6 per cent over last year, leaving a margin of safety of about 50 per cent.

Almost ridiculous is the situation in residual fuel oil. Winter demand is expected to be only 1.8 per cent higher than last year. But stocks (not including heavy crude oil in California) are now 22.1 per cent higher than a year ago.

Trend Still Increasing

Stocks of these four major products increased by 38,386,000 bbl. during the four-month period, and totaled 234,958,000 bbl. on July 31. During the last 4 weeks of July alone the increase was 11,403,000 bbl. And the trend is still up, for during the first week in August stocks of the four major products increased another 3,132,000 bbl.

If stocks increase the same amount in August and September—and there is every indication that they may—the industry's inventory of major products will be 257,000,000 bbl. at the beginning of the fourth quarter. This would exceed by 46,500,000 bbl. the stocks on hand September 30, 1947.

The main reason for this improved situation is, of course, the tremendous increase in crude production and refinery activity. During the first 7 months of this year crude runs to stills averaged 5,522,000 bbl. per day, which is 607,000 bbl. per day, or 12.3 per cent, above the same part of 1947. Compared with this increase of 13.2 per cent in production of products, consumption was only 6.7 per cent over 1947 during the first 5 months of the year, and final figures for current months are expected to be about the same.

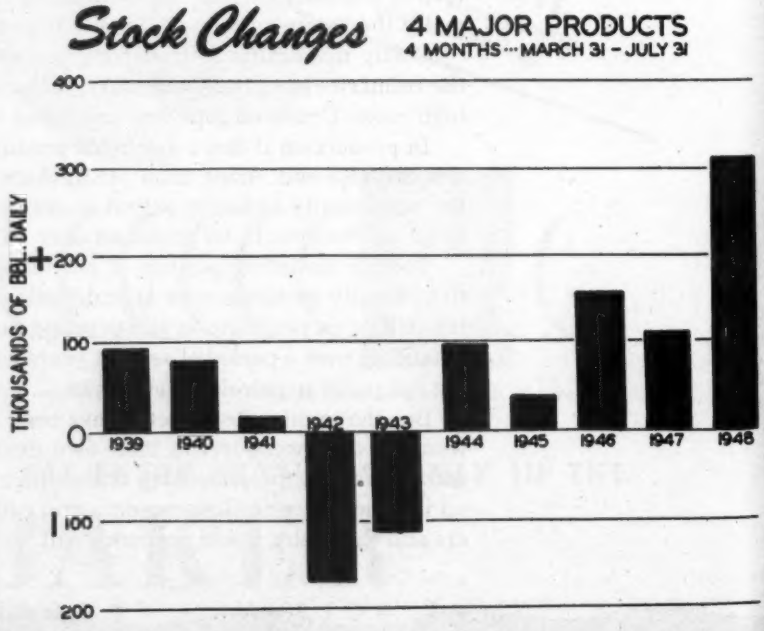
Exports Way Down

Another reason is a shift in our import-export balance. Surprising to many people is the fact that our exports of oil have decreased sharply while our imports have increased only slightly. This can be explained largely by tighter export control and the use of other sources to supply Europe and Canada.

During the first 5 months of 1948 imports of crude increased 9.8 per cent over the same period of 1947 and imports of petroleum products decreased 7.4 per cent, leaving a net import gain of 2.6 per cent. During the same period our exports of crude decreased 9.9 per cent and of products 25.3 per cent, a net drop in total exports of 21.4 per cent.

In other words, we had a net gain of about 16,000,000 bbl. from our import-export balance during the first 5 months of this year compared with our situation last year. Less than 2,000,000 bbl. of this came from increased imports and more than 14,000,000 bbl. came from decreased exports.

Instead of the United States becoming more dependent on foreign oil it appears that foreign countries are becoming less dependent on American oil.



Allocation Agreement Is Approved As Government Foresees Shortage

by Bertram F. Linz

WASHINGTON.—The industry's voluntary agreement, designed to avoid hardships as a result of product shortages next winter, was put into effect by Interior Secretary J. A. Krug August 11.

Only minor changes were made in the agreement as drafted by an industry advisory committee headed by B. I. Graves of Tide Water Associated Oil Co. One change is designed to insure that equitable distribution of supplies shall extend to customers "at all levels," as proposed at the public hearing June 18, and another is designed to provide for more definite supervision by the Interior Department by requiring that district committees and subcommittees promptly advise the director of the Oil and Gas Division of all recommendations for voluntary action by members of the industry and giving the director authority to disapprove any recommendations which in his opinion are not "in accord with the purpose and spirit of Public Law 395."

In approving the agreement 32 days after it was sent to him by Krug, Atty. Gen. Tom C. Clark warned that since it gives antitrust immunity in a broad area, the OGD should maintain a close liaison with the antitrust division "so that any activity under it which might affect the enforcement of the antitrust laws by this department may be brought quickly to your attention" so that Krug "may give prompt consideration at any time to the question whether it is in the public interest to terminate the plan before its expiration date."

To End February 28

A provision in the agreement calls for its termination at the close of business next February 28, or at such earlier time as the secretary may designate.

Clark also emphasized that the plan does not authorize any activities on the part of the industry not within the scope and purposes of Public Law 395, the main purpose of which, he pointed out, "is to correct maldistribution of scarce commodities which has resulted from the recent inflationary tendencies," and accordingly does not authorize "any acts or activities solely or primarily designed to eliminate competition in the oil industry and such actions would not be covered by the antitrust immunity granted by the statute."

Clark requested that Krug keep him advised of any complaints with respect to operation of the plan.

Closely paralleling the temporary program adopted last year to deal with spot shortages of fuel oil, the agreement is aimed at elimination and alleviation of hardship situations at the consumer level as a result of insufficiency or disruption in the supply of gasoline and other motor fuels, kerosine, distillates, and heavy fuel oils by cooperative action between industry members and with state and local fuel coordinators.

The meat of the program is in Paragraph 3, calling upon all participants in the plan to equitably distribute their available supplies among all customers, after fulfilling essential requirements for the military, food production, and services essential to public health and safety, including transportation and communication. Each participant is to give primary consideration to its pattern of distribution among its customers of the preceding season, and each supplier is required to make known to his customers, at least once every 3 months, the formula employed by him for equitable allocation of supplies.

Committees to Supervise

Supervision of the program is to be in the hands of district committees to be appointed by the National Petroleum Council, which in turn may appoint subcommittees for the various areas within each district. OGD approval of all committee and subcommittee appointments will be required.

The industry groups are authorized to assemble such data and make such studies relating to the supply and demand of petroleum or products, including the study of seasonable inventories, as may be necessary, and may make recommendations for adjusting the refinery yields to prevent disruptions in supply at the consumer level, and for the more effective distribution of products to prevent, eliminate, or alleviate hardships.

Committee and subcommittee recommendations may deal with purchases, exchanges, loans, transportation agreements, and similar problems.

The program is to be financed by voluntary contributions from the industry on such basis as the NPC and the committees and subcommittees may determine.

It is stipulated that the plan will not apply to the exportation of petroleum or products, and that no activity authorized under the plan shall concern the fixing of prices or any other action not permissible under Public Law 395.

In his letter requesting the attorney general's approval, Krug emphasized that petroleum and products are "scarce commodities" and there is no possibility that there will be supplies during the coming winter adequate to meet unrestricted demand in full.

"Petroleum products are under stringent export control and even the military and civilian branches of the Government itself are experiencing difficulty in obtaining their minimum essential requirements," he pointed out. "Although it is hoped that increased domestic output and a large net import balance combined with more adequate state, federal, and industry organization to deal effectively with the problem will result in less hardship and less disruption than during the past months, there does not appear to be any present possibility of avoiding spot shortages of petroleum products during the coming months."

A similar situation last January was the basis of a voluntary plan to alleviate and overcome shortages which was very successful, and the new agreement is identical in its essentials, Krug said.

Trainload Tariff for Oil Products Discussed

WASHINGTON.—Western rail carriers may compete with pipe lines for the transportation of oil if a proposed experiment by the Union Pacific Railroad is carried out successfully.

Representatives of the company have discussed with Interstate Commerce Commission officials a tariff which would cover the transportation of petroleum products in trainload shipments, a system which was developed during the war to supply the East Coast when the tanker situation was desperate.

The railroad proposes to institute a high-speed oil service between Salt Lake City and Spokane, Wash. A Standard Oil Co. refinery with a capacity of 15,000 bbl. daily is going into operation at Salt Lake City, and the company is building a crude line from the coast and proposed a products line to Spokane to serve the "inland empire." The Union Pacific has asked for a chance to handle the product transportation and see what it can do on it.

It is pointed out that if a satisfactory system can be developed for the rail movement it will result in the saving of large quantities of badly needed line pipe, while at the same time affording more flexible transportation than could be secured by pipe line.

House Group Unworried Over Oil Now, But Ponders Future Policy

WASHINGTON.—The House interstate commerce committe reported August 16 that the petroleum outlook for the coming fall and winter "is somewhat more favorable" than was the situation last year. But the longer-range outlook is the subject of "much concern," and complicated by the international situation, the committee found.

The report, prepared by Chairman Charles A. Wolverton of New Jersey following the close of the special session, based its conclusions as to the present situation on testimony of oil-company executives and government officials.

On testimony from the same sources, and projections by the committee's own staff, the committee found it was less clear just how far the Middle East may provide Europe's petroleum requirements, and pointed out that the testimony of Commerce Department and the Armed Services Petroleum Board officials indicated that some delay in scheduled expansion of Middle East production already is in sight owing to diminution in the amount of steel, especially of tubular goods, permitted to be exported.

"We are faced, accordingly, with the necessity of renewed consideration of whether Europe's requirements can be met as planned, and whether, as your committee previously pointed out, the alternative considerations now are pertinent of (1) meeting Europe's needs by petroleum from the Western Hemisphere; (2) meeting Europe's needs from other energy resources; and (3) reductions in European requirements," Wolverton said.

Europe's Plans Questioned

How much of an added burden will be imposed on the United States as a result of the shutdown of the Haifa refinery or other disturbances has not been developed, he added.

"In the light of the evidence concerning the current situation and the outlook for the future," Wolverton continued, "it appears to your committee that the time may well have arrived for the full review of the contemplated European use of petroleum as a source of energy which has been indicated might be necessary."

Such review, he said, should cover the feasibility or desirability of plans for mechanization of European agriculture, the shift from coal to diesel power on the railroads, increase in motor transportation and the shifting of public utilities to oil fuel, and particularly "the result in an emergency of an increased European dependence on petroleum either from their own or our own point of view."

A study by the committee of exports to Canada developed that discussions which last winter resulted in cutting back exports of oil from the United States have been continued, with preliminary indications that total import requirements of Canada from the United States this year will be some 4,600,000 bbl. less than in 1947, including a reduction of 1,200,000 bbl. of light heating oils. The tentative program, the report showed, calls for a decrease of some 6,000,000 bbl. of crude from the Middle West, where idle refinery capacity has been created by a shortage of supply, and an increase of some 3,000,000 bbl. of gasoline from the East Coast.

Steel Termed Problem

A large part of the report was devoted to consideration of the oil industry's steel supply, which the committee emphasized is the crux of the oil-shortage problem. But the committee warned that in the light of developments in the oil industry itself, the inability to receive the quantities of steel stated by the National Petroleum Council as necessary to meet the increased production of petroleum "cannot be blamed for any oil shortage this coming year."

Continuation of the expected rates of production of oil-country goods and line pipe is essential, but it does not appear that there exists a controlling need for a voluntary steel agreement covering production, the committee said in summing up its studies.

The comparative demands for plate are in such amounts and character that there is not sufficient information now for a clear-cut decision regarding the way in which the plate "pie" should be cut up, but the direction of plate production cannot be treated separately from consideration of sheet consumption, insofar as the sheet mills can produce plate.

Although some weeks ago it was felt that the tanker situation had been cleared up, at least for the moment, there is some question now about the adequacy of tankers during the coming year, the determining factor being the situation in the Near East.

No conclusion can be reached at this time regarding the conflicting positions relating to keeping all petroleum steel for domestic production or to using whatever steel is required for the rapid development of foreign sources of oil, but "it does appear at this time, however, somewhat unreasonable to export large quantities of steel for use in the unsettled Middle East, when such steel could be used advantageously in the Western Hemisphere."

Further investigation also is needed to determine whether the distribution of steel in the oil industry "is a cause or a result of an apparent increasing dominance of large producers."

All that has gone before, Wolverton said, indicates the need for further examination of the extent to which we have reached a place where we should or must become increasingly dependent upon outside sources for obtaining such supplies.

"It has been suggested to the committee, on the one hand, that the preservation of an assured supply available in the event of national emergency would well imply the maintenance and building up of domestic production with limited reliance upon foreign sources. It has also been suggested that the same emergency considerations would entail the maximum effort toward importations during noncritical times for current use, with accompanying storage for emergency periods, the best storage being stated to be right in the ground," he said.

"It is certain that whatever more or less permanent dependence is placed on imports, such dependence must be with reasonable certainty of their continuation.

"Such dependence requires consideration, as well, of the means of transportation."

Favors Healthy Industry

"This also means consideration, in any event, of a normal, healthy, maintained domestic industry. Just for example in this connection, is the possibility that the immediate larger supplies are the result of too closely approaching, or somewhat exceeding, the maximum efficient rates of production, with long-run detriment."

Also to be considered, Wolverton said, is the pattern of our oil-product consumption in the light of military requirements in the event of war.

"Numerous industry witnesses recently have suggested that the time has arrived when the nation should appreciate that petroleum should not be expected to fuel the entire economy," he explained. "The examination of this suggestion is basic to the formulation of any fuel policy. Involved are such matters as the trend in the uses just above mentioned, the possibilities of change in jet-fuel specifications to mitigate dependence on the distillates, the efficiency of our internal combustion engines and fuel burners, the dependence of our transportation system on petroleum."

this week

SUPPLY—Production and stock data indicate threat of oil shortage over. . . . Stocks of all important products considerably higher than year ago. . . . Gasoline for remainder of touring season definitely assured. . . . Outlook comfortable for winter's heating oils. . . . Exports off sharply. . . . Less dependence on imports. . . .

GOVERNMENT—Administration promulgates oil-allocation agreement in belief shortage of products will continue. . . . Based on last winter's conditions. . . . Contains rigid antitrust safeguards. . . . ¶House committee, reporting on its oil investigation, takes optimistic view of current supply outlook. . . . Turns to longer-range problems of import-export policies, steel supplies, and maintenance of healthy domestic industry. . . .

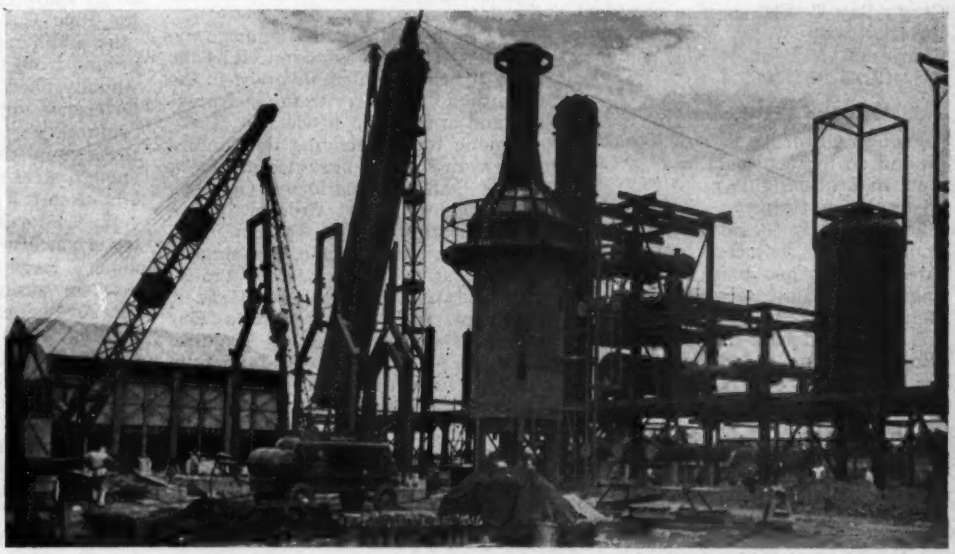
TRENDS—Well completions for week ended August 14 totaled 770, slightly below completions for previous week but well above the 722 completions recorded for the same week in 1947. . . . ¶Production showed slight drop from all-time high set during the previous week, but at 5,501,335 bbl. daily still was higher than any previous production average in history. . . . Illustrating upward trend was the fact that the new record of August 7 was the sixteenth new yearly record established this year. . . . ¶Stocks of four major products showed a gain of 3,132,000 bbl., in spite of a drop in runs to stills. . . . Most of gain is in distillates. . . .

INTERNATIONAL—First section of trans-Arabia pipe line in use. . . . Increases crude deliveries to Ras Tanura refinery. . . . Line embodies unusual engineering features. . . . Supported above ground on piles. . . . Restrained from expansion. . . . Company insists it will continue line to Mediterranean despite steel troubles. . . . ¶Venezuela launches extensive study of gas conservation projects to reduce flaring. . . . ¶House committee leaves for Mexico to study means of aiding oil production there. . . . ¶Italian gasoline consumption is now close to prewar level. . . .

NATURAL GAS—Progress in utilizing flare gas in Texas illustrated by completion of one big natural-gasoline plant, start of another. . . . ¶Government authorizes subsurface storage of natural gas in federal lands of Michigan. . . . ¶FPC states policy on rate schedule changes. . . . Changes resulting from tax increases must be reviewed by commission. . . .

REFINING—U. S. co-op buys 115,000 bbl. of Middle East crude oil. . . . Second shipment is scheduled for mid-November. . . . ¶Purchase of WAA ammonia plant at Lake Charles, La., is approved. . . . ¶Government bureau plans wage survey of refining industry. . . . Not connected with survey ordered by the National Petroleum Council last July. . . . ¶Group makes inspection tour of new catalytic cracking unit at Sugar Creek refinery. . . . ¶Sinclair completes new research laboratories at Harvey, Ill. . . . ¶Houston Navigation District abandons plans for condemnation proceedings. . . . Says Phillips Petroleum has more use for the site. . . .

PIPE LINES—Construction nears midpoint at Debajuro on Creole's Ule tank farm-Amuay Bay crude-oil line. . . . ¶About 25 per cent of Cities Service Gas Co.'s Ulysses-Kansas City line is completed. . . . ¶Sinclair Refining Co. delivers record total of products through the company's eastern division products line. . . . ¶Big-inch facilities to be completed by January 1. . . .



Progress in the oil industry is graphically illustrated in this picture of construction under way in the new 20,000-bbl. refinery of Carter Oil Co. at Billings, Mont. Two gin poles here are shown lifting a 150-ton fractionating tower into position on a 15-ft. steel supporting structure. The refinery, being built on 340-acre site, is scheduled for completion late in 1949. Tallest structure in the refinery will be the catalytic cracking unit, which will tower 180 ft. above the surrounding area

New Plants Illustrate Gain in Processing Flare Gas in Texas

HOUSTON.—The rapid expansion of the natural-gasoline ond other plants for processing flare gas in Texas is illustrated by two projects handled by Fish Engineering Corp. here.

The natural-gasoline plant which the company is constructing for Witco Hydrocarbon Corp. in Barnhart field, Reagan County, Texas, commenced operation last week.

The plant has a capacity of approximately 30,000,000 cu. ft. per day, and is calculated to produce approximately 100,000 gal. of liquid products. The production is divided approximately equally between natural gasoline, L.P.G., and propane. Previously the gas had been flared.

The plant has connected all wells in the field to its gathering system. The total number of wells at the present time is approximately 50; although it is estimated that the total number of wells will eventually be doubled by further drilling undeveloped acreage. The producers in the field are: Amerada Petroleum Corp., General American Oil Co., Danciger Oil & Refining Co., Skelly Oil Co., and Sharpless Oil Corp.

In connection with the gasoline-plant project, Witco Hydrocarbon also has constructed a carbon-black plant. The plant has a capacity of 15,000,000 cu. ft. per day and uses the channel-black process. The first unit of the carbon-black plant was put in operation June 15. The balance of the plant has just recently been placed in operation. Work on the plants was started in late February this year.

Robert I. Wishnick, of New York, is president of Witco Hydrocarbon Corp.; Ray C. Fish is vice president, together with W. F. McDonald and Charles E. McKinney. The company has offices in Houston.

Cisco Plant Started

Fish Engineering is now breaking ground on the construction of a complete natural-gasoline plant for Cisco Hydrocarbon Corp.

The plant is located in Stephens County, Texas, adjacent to the pressure-maintenance plant which Fish Engineering constructed for Fred M. Manning, Inc., this spring. The gasoline plant will have a daily gas-handling capacity of 25,000,000 cu. ft. per day, and is calculated to produce approximately 50,000 to 60,000 gal. per day of natural gasoline, L.P.G., and propane, about equally divided between the three products. It is estimated that the plant will be ready for operation December 1 of this year.

Approximately 20 miles of gas-gathering and shipping lines will be installed as part of the project. Approximately 18,000,000 cu. ft. per day of the gas processed by the plant will be returned to the formation for maintaining pressure. The balance of the gas processed will be used for plant fuel, for methanol production, and some residue gas will be sold to the local pipe lines serving the area.

In addition to the natural-gasoline plant, as part of the over-all project, Cisco Hydrocarbon Corp. also will construct a methanol plant.

Gas-Industry Men Meet To Plan for Emergency

WASHINGTON.—Representatives of the gas industry met last week with government officials to discuss the problems involved in an effort to prepare the nation's industry for a war emergency.

The meeting was called by the National Security Resources Board, which is making surveys of all major industries as a basis for recommending legislative or other action to bolster the national defense.

The major subjects of discussion were the supply and estimated demand for natural and manufactured gas service over the next 5 years; the present planned construction program of the industry and specific production or construction bottlenecks; and the question of gas in relation to coal and fuel oil, from the standpoint of conserving fuels most vitally needed for defense.

As in all such discussions, the question of steel was advanced as the most difficult problem involved in the expansion of gas service to meet present and anticipated needs.

Among those attending the conference were F. M. Banks, vice president of the Southern California Gas Co., Los Angeles; Stuart Crocker, president, Columbia Gas System, Inc., New York; Ross Gamble, Washington representative, Texas Eastern Transmission Corp.; Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs; W. G. Maguire, chairman of the board, Panhandle Eastern Pipe Line Co., New York; Gardiner Symonds, president, Tennessee Gas Transmission Co., Houston, and representatives of several distributing companies.

The group was set up by Edward Falck, chief consultant on power and utilities of the board, who, with Robert Wardle, Jr., NSRB consultant, Capt. Thomas J. Kelly, USN, director of the petroleum and natural gas division of the board, and E. J. Gealy and Paul Stratton of the Munitions Board, represented the Government at the meeting.

A similar survey already has been made of the power industry. Representatives of the oil industry are to be approached later. An exhaustive study of the petroleum situation was made for the board by Wallace E. Pratt, petroleum consultant to Chairman Arthur M. Hill.

Steel Allocated for Tanker Construction

WASHINGTON.—A voluntary agreement for the allocation of 40,000 tons monthly of steel products for the construction of tankers from October, next, to February 1949, was approved last week by the Steel Products Advisory Committee of the Office of Industry Cooperation.

The action was taken at a general meeting with Secretary of Commerce Charles Sawyer, OIC Director John C. Virden and other government officials, at which a number of proposed agreements were reviewed. Other agreements covering petroleum industry requirements were discussed, but no action was taken.

The tanker program is subject to review by the Steel Producers Committee before it is put into shape for formal adoption.

Meanwhile, refusal of the OIC to work out allocation programs for oil-country tubular goods and line pipe, on the ground that the mills are running at capacity and no additional supplies could be developed through such programs, is bringing protest from nonintegrated pipe producers.

In a letter to Virden last week, N. E. Turney, vice president of Naylor Pipe Co., Chicago, charged that "the allotments of steel which we are getting from the mills have been continually decreasing as a result of interference by various government "voluntary" allocation programs to the extent that we are not getting enough steel at present to justify one 8-hour shift 5 days a week.

"In so far as the petroleum industry is concerned, even though we have a very large volume of unfilled orders for gas gathering line pipe and for surface casing used in oil well drilling, we have been forced to virtually discontinue all production on this work in favor of smaller orders for lighter weight pipe in other industries.

"It doesn't seem right to have our plant virtually idle in so far as the petroleum industry is concerned when the industry is desperately in need of pipe," Turney declared.

Tapline, Refinery Plan Await Government Word

HOUSTON. — Construction of the trans-Arabia pipe line is proceeding at a reduced rate pending a decision by government officials in Washington on further exports of steel pipe for the project.

In a discussion here last week, B. E. Hull, president of Trans-Arabian Pipe Line Co., said that although the U. S. Department of Commerce is expected to announce its decision on the pipe export in September, it would be several more months before the normal rate of construction could be resumed assuming the fourth-quarter export application is approved. Shipping would have to be brought back from present scattered locations, and other arrangements renewed.

Pipe already shipped will lay about 240 miles of the total line which will extend 1,067 miles from the Persian Gulf to the Mediterranean. Crews are now laying only about a half mile a day, although 1½ miles daily would be possible were pipe fully available.

Hull emphatically declared the company has no intention of abandoning the project. He said this question had been asked of the company in Washington, but declared that three other Middle East pipe-line projects are "waiting on us to get through so they can begin." These lines are Middle East Pipe Lines, Ltd., from Iran; Gulf-Shell, from Kuwait; and Iraq Petroleum Co., Ltd., from Iraq.

The convention permitting Trans-Arabian Pipe Line Co. to carry the line across Syria has not yet been ratified by the Syrian Parliament. When the convention is ratified and other uncertainties cleared up, Hull said, Mediterranean Refining Co., consisting of several American companies, is expected to start immediately on preliminary work for the construction of a 100,000-bbl. daily refinery at the Mediterranean terminus of the line in Lebanon.

(A detailed description of the problems encountered in laying the first section of Tapline appears on page 65 of this issue.)

ERP Oil Deals Approved

WASHINGTON. — The Economic Cooperation Administration announced August 15 that it has issued authorizations to Norway for the expenditure in this country of $680,000 for lubricants and $220,400 for motor gasoline.

The ECA also announced it had authorized Greece to procure, through the Navy department, $250,000 worth of motor gasoline, $90,300 worth of diesel oil and $118,000 worth of light fuel oil from Saudi Arabia.

Export Controls Keep Shipments Of Oil, Steel Well Below 1947

WASHINGTON.—Oil and steel exports have been reduced by export controls to levels this year considerably under those of 1947, it was asserted over the week end by Secretary of Commerce Charles Sawyer in his quarterly report to Congress on operation of the Decontrol Act of 1947.

Export controls over petroleum, Sawyer reported, have been "closely geared to changes in the domestic supply situation," and in the first half of this year, crude exports were at an annual rate of 38,000,000 bbl., or 1.8 per cent of supply, and major refined products were at an annual rate of less than 54,000,000 bbl., or 3 per cent of supply, compared with exports in 1939 of 72,000,000 bbl. of crude, or 5.6 per cent of supply, and 90,000,000 bbl. of refined products, 7.4 per cent of supply.

Steel exports, which totaled 6,500,000 tons, or 10.3 per cent of domestic production, in 1947, are moving this year at a rate of less than 5,000,000 tons, or about 7.5 per cent of production.

The controls on steel, oil and other commodities, he said, are being used to cushion the inflationary impact of foreign demand, influence the geographic distribution of scarce materials in the interest of world recovery, and screen shipments to Eastern Europe.

"Foreign demand has not been permitted to exert a significant inflationary influence on the general price level in the United States," Sawyer declared.

"While the necessity of meeting at least the more urgent requirements of foreign countries for scarce materials has been recognized, export quotas have been limited to the amounts which can reasonably be spared from domestic use without material damage to the economy."

Phillips to Erect New Office Building

CONTRACT has been let for construction of a 12-story office building to house headquarters of Phillips Petroleum Co. in Bartlesville, Frank Phillips, chairman, and K. S. Adams, president, announced August 15.

The contract also covers a seven-story apartment building for Phillips employes, of which there are more than 3,000 in the city.

The new building will have a gross floor space of 415,000 sq. ft. and will include assembly rooms, conference rooms, library, medical center, and a cafe to feed between 800 and 1,200 people. A gymnasium seating 3,000 also is to be provided.

The new building will be connected to the present office building by a tunnel under the intersection separating them. The planned apartment building will provide 206 completely furnished and air-conditioned units.

Artist's drawing of the new buildings to be built for Phillips Petroleum Co. in downtown Bartlesville

International

WORLD-WIDE OIL DEVELOPMENTS

Gas Conservation Program Started In Venezuela by Consultant Group

GAS-CONSERVATION plans of the Venezuelan Government have advanced to the point that information is now being collected on available gas in Eastern Venezuela, and an on-the-ground survey is being made by a group of natural-gas experts and government and oil-company officials.

This group has just returned from Eastern Venezuela where it studied the volume of gas available for use in the production of low-cost electric power and as fuel for various industries. Included in the party were Jose Martorano Batisti, director of the petroleum bureau; Dr. Paradisi, director of the bureau of mines; Luis Herrera, representing Mene Grande Oil Co.; and members of E. Holley Poe & Associates. The latter company has been contracted by the government to make a detailed survey of gas utilization in Venezuela.

The party inspected the recently completed gas plant of Creole Petroleum Corp. at Jusepin, Monagas, which stabilizes gas formerly flared and returns it to the formation to maintain pressure. It is planned to increase the capacity of this plant and to drill additional input wells throughout the field.

Other Sites Visited

A similar plant now under construction at Mulata, Monagas, was also visited, as was the site of a proposed liquefied petroleum gas plant at Anzoategui to serve El Roble, San Joaquin, and Guario fields. The sites of several other projected gas-processing plants throughout the country will be visited by the party in the near future.

On July 20 representatives of the oil companies and government met with members of the Poe organization to discuss the situation. P. F. Keith of Hydrocarbon Research Corp., New York, discussed the use of natural gas in synthesizing gasolines. In his address he pointed out that if capital and operating costs on any plant could not be brought down equal to United States costs, by the elimination of housing obligations and import duties, the creation of more favorable income-tax provisions, and the guarantee of stabilized labor costs, any venture of this sort was not feasible.

Production of natural gas in Venezuela during 1947 was almost 410,000,000 M.c.f., of which only 13.8 per cent was used for industrial purposes. New natural-gasoline and pressure-maintenance plants completed during 1947 increased the industrial consumption to 14.02 per cent during the first 4 months of this year. When plants currently under construction are completed it is expected that about 23 per cent of the over-all gas production will be consumed in industrial operations.

Bizonal Germany Contracts For Middle East Crude

Bizonal Germany has contracted for 90,000 tons, about 675,000 bbl., of crude oil from Saudi Arabia and Kuwait, according to a release from the Joint Export-Import Agency in Frankfurt. Deliveries will be extended over the remainder of 1948.

This latest purchase brings the total of crude oil bought under JEIA auspices for the reconstruction of the German refining industry to nearly 200,000 tons, or 1,500,000 bbl. The plan envisions the rebuilding of the German refining industry to a yearly capacity of 2,600,000 tons, or approximately 50,000 bbl. daily. Bizonal Germany covers the American and British occupation zones.

Meanwhile, exploratory work in Germany continues, and the first of two portable seismographs has arrived at Bremerhaven from the United States.

Italian Gasoline Use Close to 1940 Level

ITALY'S domestic gasoline consumption this year will approximate the 1940 consumption of about 400,000 tons, or 3,200,000 bbl., according to a report from the Italian Ministry of Industry. However, the ministry will permit the consumption of an additional 95,900 tons (720,000 bbl.) of gas oil and 268,100 tons (2,000,000 bbl.) more fuel oil than was consumed in 1940 when the consumption ran to 304,100 tons (2,300,000 bbl.) of gas oil and 1,031,900 tons (7,800,000 bbl.) of fuel oil.

Gasoline, gas oil, and fuel oil are to be marketed up to the 1940 totals at the rate of 80 per cent by Azienda Generale Italiana Petroli (AGIP), Royal Dutch-Shell, and Standard Oil Co. (N. J.) groups, and the remaining 20 per cent by the other concerns. However, the increase in gas oil and fuel oil quotas will be supplied equally by the large oil companies and the smaller concerns.

This year the Italian refineries are scheduled to manufacture approximately 542,000 tons, 4,336,000 bbl., of gasoline using crude oil imported from the Middle East. The best gasoline that Italian refineries now turn out is about 10 to 12 octane numbers below the prewar quality there, while lubricating oil, aviation gasoline, and paraffin still have to be imported.

The motor fuel now being produced in Italy is composed about 75 per cent of straight-run gasoline of 46 to 50 octane, 15 per cent of cracked gasoline of 60 to 65 octane, and 10 per cent of reformed blending stock of 68 to 70 octane. This gives a finished product with an average octane rating of 50 to 54.

Thornburg to Colombia

Max W. Thornburg, consultant on world oil operations, has been engaged to advise the Colombian Government in revising the draft of the proposed new petroleum law for that country, according to reports from Bogota. Thornburg was once petroleum advisor to the U. S. Department of State.

First Section of Trans-Arabian Line, Now in Use, Has Unusual Features

A "STRUCTURE" rather than just a pipe line is the term used by the builders to describe the first section of the trans-Arabian pipe line because of the unusual construction features necessitated by the peculiar climatic and topographic conditions encountered in the Arabian desert.

Instead of being buried, as is the usual practice, most of the line is carried above the ground on steel or concrete supports. Still more unusual is the fact that no expansion loops or bends are used in the aboveground sections, in spite of the extreme daily changes in temperature. Instead the line is "restrained" and held back to an exact horizontal and vertical line, with changes of direction firmly anchored.

The first section of this line, 30-in. in diameter, is now in use between Abqaiq and Qatif fields, a distance of 37 miles, taking crude to the Ras Tanura refinery and loading terminal of Arabian American Oil Co. At Qatif the new line is connected to an older 20 and 22-in. line 17 miles long, and the combination is capable of delivering 330,000 bbl. per day to Ras Tanura. The big line starts at Trap Setting No. 2, 7½ miles north of the main Abqaiq camp and center of producing facilities.

This is a temporary use, however, as this first section is designed to be the southeastern leg of a 30 and 31-in. pipe line running across the Arabian Peninsula 1,067 miles to a terminal on the Mediterranean 6 miles south of Sidon, Lebanon.

International
WORLD-WIDE OIL DEVELOPMENTS

The line is being built by Trans-Arabian Pipe Line Co., with International Bechtel, Inc., as contractors. Because of the unusual operations, and because this first section served as a "guinea pig" in solving problems to be met in similar country over most of the rest of the route, Trans-Arabian officials furnished this description of how the job was done.

Subkhas Gave Trouble

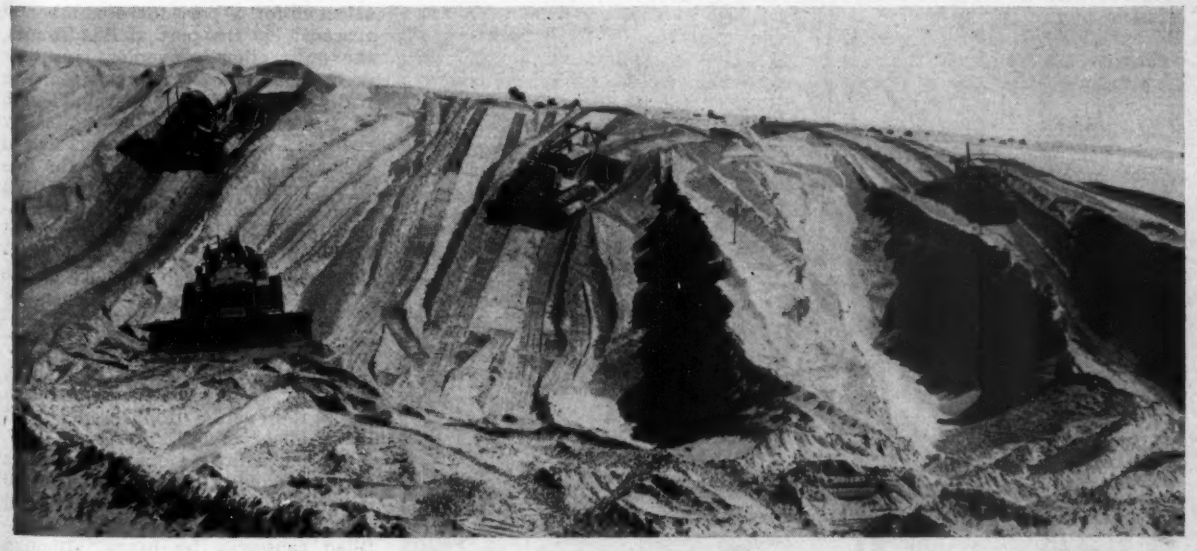
The area between Abqaiq and Qatif is largely sand-dune country, unvegetated save for sparse shrubs and an occasional battered date palm, underlain by coarse, brittle, marine limestone and interspersed with salt-encrusted mud flats called subkhas. In places the sand dunes rise to a height of 40 ft., or more, moving slowly to the southeast with the prevailing northwest winds. Measurements taken by Arabian American Oil Co. indicate that dunes 20 ft. in height move about 50 ft. per year, with the rate of movement roughly inversely proportional to the height of the dune face.

Owing to the unusual terrain conditions and the large diameter, thin wall, pipe, the engineers and pipe-line construction men were presented with a variety of new and unusual design and construction problems. Burial of the line in the orthodox manner was the desired type of construction. This was unfeasible, however, in the highly corrosive subkhas and in areas in which hard limestone lay close to the surface.

Burial in the subkha areas not only seemed inadvisable because of the serious corrosion problem but would have involved the imposing problem of dewatering the ditch to keep the empty pipe from floating. Burial in the areas in which rock lay at or near the surface presented no problem new to pipelining but was deemed to be inordinately expensive to excavate.

Accordingly, in such areas, the line was designed to be laid above ground, on concrete supports in the rocky stable areas and on steel bents through the subkha areas. Of the 37 miles from Trap Setting No. 2 to Qatif, 12½ miles were laid above ground on concrete supports, 12½ miles above ground on steel bents and the remaining 12 miles were buried.

The steel bents, consisting of two 8-in. or 10-in. H-beam piles on 6 ft. centers driven to depths varying from 10 to 20 ft. and capped with pile cutoffs, were used in lieu of wood piling



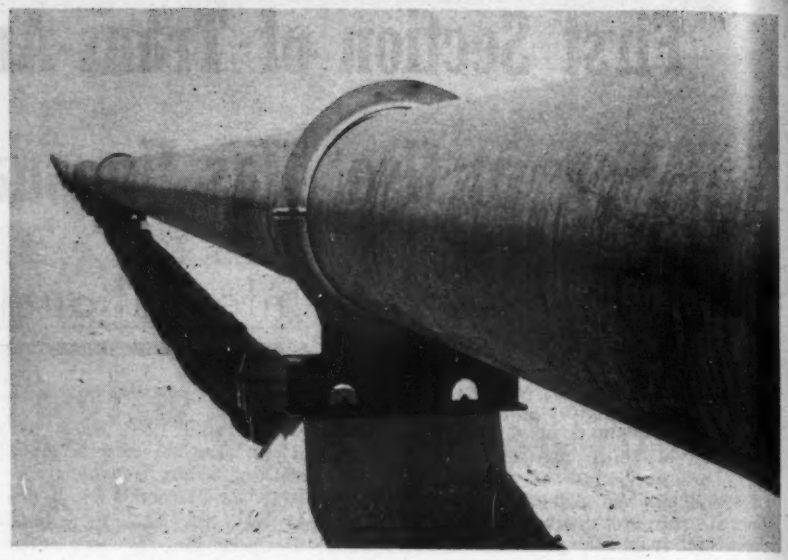
Bulldozers leveling a sand dune to provide a right-of-way for a section of the trans-Arabia pipe line 30 miles south of Ras Tanura near the Persian Gulf

specified for the job but not available in time. Bents and concrete supports were spaced at 66-ft. intervals.

Owing to the large diameter of the line, to the thin-wall pipe (¼-in. and 5/16-in.), and to the possibility that portions of the line above ground would be covered by sand from time to time, the designers decided against the use of any type of expansion bend for the aboveground sections and specified that the line should be fully restrained. This means that supports must be set to line and grade and that horizontal and vertical changes of direction beyond a minimum of about 1° must be anchored in some manner, the nature and size of anchor depending upon the magnitude of the direction change.

Unorthodox Method

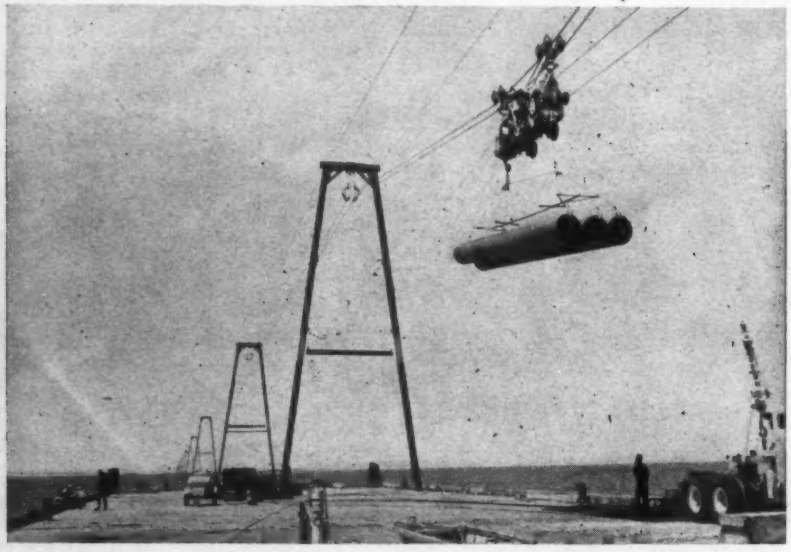
Restrained aboveground construction represents a radical departure from orthodox methods of laying oil or gas pipe lines, although it has been used on several previous occasions in construction of large-diameter, thin-wall, aboveground water lines. The application of this principle to oil pipe-line construction has naturally been a highly controversial issue, but the completion of the first 25 miles of this type of line forces the conclusion that restrained construction has a very definite place, from the standpoint of economy, reduced corrosion, and ease of maintenance, in the construction of future large-diameter lines in areas where burial is difficult. The special problems involved in laying aboveground restrained line have led some to term it "a structure" rather than just a pipe line.



A completed section showing how the pipe was supported above ground and restrained by ring girders

The pipe was fabricated at the Consolidated Western Steel Co. plant near Los Angeles from Geneva steel plate, ½ in to ⅜ in. in thickness and 31½ ft. in length. The sheets were trimmed, formed into cylinders in giant rolls, automatically welded longitudinally inside and out, and finally formed and expanded hydraulically beyond the yield point, to cold-work the metal and raise the yield point. A minimum specification of 52,000 psi. circumferential yield strength was adhered to. The pipe was tested, after cold-working, to 90 per cent of yield and will be operated at a maximum of 65 per cent of yield.

The completed joints, beveled for field welding, averaged slightly more than 31 ft. in length. Equal quantities of 30-in. and 31-in. diameter pipe were fabricated, to be nested for shipment as an economy measure. All of the 31-in. diameter pipe was of ¼-in. wall thickness, but the 30-in. pipe is being fabricated in roughly equal quantities of ¼ in., 5/16 in. and ⅜ in. wall thickness. The 30-in. diameter pipe only was used in the Abqaiq-Qatif section, 31 miles of this being ¼-in. wall thickness and the remaining 5/16 in.



"Skyhook" bringing the pipe ashore at Ras el Misha'ab, Saudi Arabia

New Port Built

The port of entry for the bulk of materials for the pipe line was Ras el Misha'ab, a new port and camp constructed on the shore of the Persian Gulf, 175 miles northwest of Qatif and just south of the border between Saudi Arabia and the Kuwait Neutral Zone. This location was selected for a port for a number of reasons: (1) the port at Ras Tanura, the only other convenient port for ocean-going vessels in the area, was badly congested; (2) average length of truck haul would be materially reduced; (3) terrain between Ras el Misha'ab and most points on the line will permit use of harder-tired vehicles than those which are necessary in the sandy areas; an (4) Ras el Misha'ab was one of the few locations along the western shore of the Persian Gulf where an ocean-going vessel could approach within a reasonable distance from shore.

The first of a series of pipe ships, a Liberty, 43 days out of Long Beach across the Pacific, dropped anchor off Ras el Misha'ab on December 28, 1947. It carried a little more than 5 miles of pipe, equally divided between 30 in. and 31 in. The pipe was moved from ship to a temporary earth-filled causeway by barge, although since the first of May pipe has been moved by an overhead cableway

known as the "Skyhook" from a sea island to the pipe stockpile.

By January 10, 1948, the first of four units for denesting and triple-jointing or quadruple-jointing of pipe was ready for operation, and work of welding three joints of 30-in. pipe into units about 93 ft. in length began. The welding was by the automatic shield arc process, the machine used having been especially designed and built for this work by the Westinghouse company in cooperation with Bechtel engineers. The key to the success of the operation was a mechanical line-up clamp which permitted alignment of pipe walls within 1/64 in. and which rotated with the pipe over a stationary water-cooled copper backup shoe while the weld was made. Each of the four automatic machines is capable of an average of four completed welds per hour.

Special Trucks Used

Hauling of heavy loads in Saudi Arabia, particularly in the sandy areas, presents transport problems rarely encountered in other parts of the world. Trucks must be especially designed for desert driving with large-capacity cooling systems and large low-pressure tires. For the hauling of pipe and heavy equipment, the Abqaiq-Qatif pipe line construction used a fleet of 30 Kenworth 4 by 6 and 6 by 6 trucks, equipped with 14 by 20, 8, 10, or 12-ply tires and powered by Hall-Scott 300-hp. gasoline engine.

The pipe trucks were equipped with fifth wheels and dual-axle dollies. Nine or ten 93-ft. lengths were carried with loads varying from 33 to 42 tons. Average loaded speeds of 15 miles per hour were maintained on the haul from Ras el Misha'ab to the line, owing to heavy sand traversed over a portion of the route, and to mud in the subkhas. Pipe was unloaded along the right-of-way by D-8 sideboom tractors, two of them handling each 93-ft. unit.

The Abqaiq-Qatif pipe line was built from the northerly end where a camp was established in February. Driving of steel piles for aboveground sections was started on February 10, and the first load of pipe was strung on the line on February 16. Field welding was started on February 25 and the 37 miles between Qatif and Abqaiq Trap Setting No. 2 were welded by April 22. Following completion of hydrostatic tests, oil was started through the line on May 5.

Clearing of the right-of-way required the movement of large quantities of sand through the dune areas, and all available earth-moving equipment, including bulldozers, carryalls, and draglines, were kept busy. As much as 20,000 cu. yd. of sand were moved per day with the equipment, working two 10-hour shifts.

Ditching proved to be generally difficult in buried sections of the line. In sections where a ditching machine was used, trouble was experienced with sloughing of sand into the trench. In some areas in which use of the ditching machine (a Buckeye Model 48) seemed to be indicated, the machine was able to travel no more than a few hundred feet without encountering ledges of hard rock which prevented further progress.

Numerous attempts were made in the rocky areas to use a 20-ton giant ripper pulled by four to six D-8 tractors to break up the rock in the ditch. Use of the ripper was partly successful in scattered short sections where the rock was soft or laminated, but even in these sections it was difficult to keep the ripper on a straight course, and a crooked ditch requiring considerable dressing-up resulted. For the most part the rock was too hard for the ripper and it necessary to resort to blasting, followed by a backhoe.

The greatest difficulty in attempting to make a ditch in this area arose from the fact that the subsurface conditions were so nonuniform. Attempts to use either the ditcher or the rooter frequently failed after no more than a few yards progress, and it became necessary to use a combination of ditching machine, rooter, backhoe, and blasting, with carryalls in the sandy areas, to complete the ditch.

Welding Was Rapid

Protection of buried sections of the line against corrosion is achieved by a field-applied coat-and-wrap job supplemented by cathodic protection using magnesium anodes. The coating consists of an application of petrolastic asphalt having a pour point of 210° F. followed by a wrap of glass floss and a final flood-coat of asphalt. The occasional subkha having very low-resistant soil constitutes an ideal ground bed for the anodes, and preliminary tests indicate that buried sections of as much as 7 miles may be adequately protected by a cluster of no more than two 17-lb. Galvapac anodes. In rocky areas added protection is provided to the pipe treatment by lining the ditch with sheets of asphalt-impregnated asbestos padding 3 ft. wide and $\frac{1}{8}$ in. thick.

Under favorable conditions, field welds were made at an average of one every 30 minutes per welder, using Shield-arc 85 welding rod. Excellent welding quality was maintained throughout by the use of gamma-ray weld inspection and control. Using a Price electrically driven internal line-up clamp with two stringer bead men, the complete line-up and stringer bead operation required about 4 minutes per joint.

As might be expected, construction of the Abqaiq-Qatif line was attended by more than the usual amount of unfavorable weather. Between March 1 and April 3 a total of 10½ working days were lost owing to heavy rains or high winds and sandstorms. High winds are normal at this time of the year, but the heavy rains came as a surprise to those who did not realize that the total rainfall in the area averaged 2 to 4 in. annually.

Following completion of the line from Qatif to Abqaiq Trap Setting No. 2, the pipe-line crew continued with extension of the line to the main Abqaiq producing area 7½ miles farther south. Before leaving this area, a parallel 22-in. line 7½ miles long was also built for Arabian American Oil Co. The crew is now laying pipe on the next increment of Tapline, from Qatif 110 miles northwest to the vicinity of Abu Hadriya, another of Aramco's large proven oil fields. As of July 24, 19 miles of this section has been laid.

Once the entire line from Abqaiq, to the Mediterranean has been completed, oil from the Abqaiq, Qatif, and Abu Hadriya fields may be moved to the western terminal, and with the flexibility provided by the connection at Qatif it will also be possible to move a portion of Abqaiq oil in the 30-in. line to Ras Tanura, making up the withdrawal at Abu Hadriya.

International

Los Angeles Refinery To Be Sent to Italy

The Los Angeles refinery of Pathfinder Petroleum Co., bought recently by Socony-Vacuum Oil Co., Inc., is now being dismantled for shipment to Italy, where it will be erected at Naples.

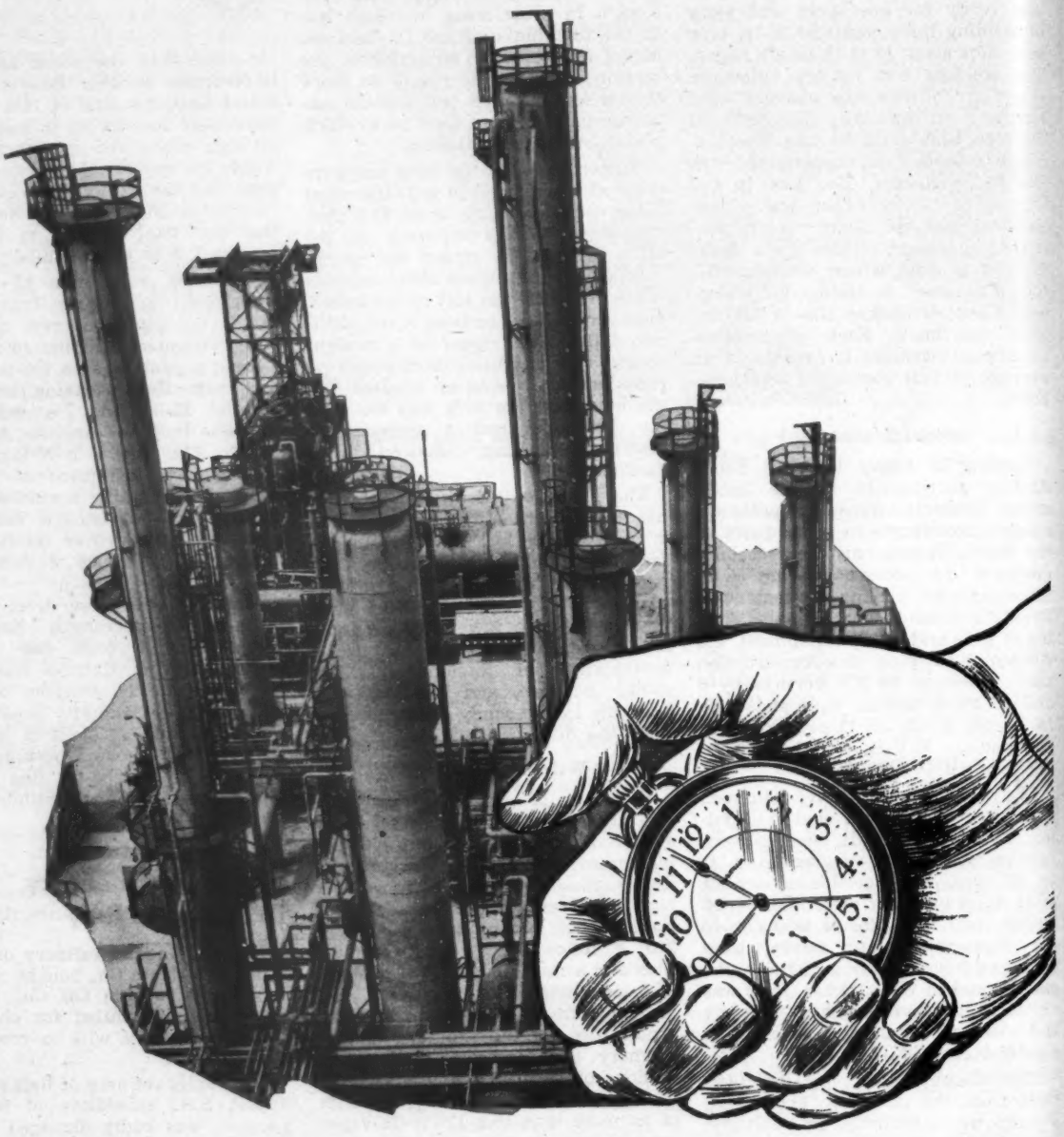
The Naples refinery of Raffineria di Napoli, S.A., subsidiary of Socony-Vacuum, was badly damaged during the war.

Pathfinder's Los Angeles refinery had a capacity of 2,000 bbl. and during the war processed West Texas crude shipped to the West Coast in tank cars. It had been idle since the war.

Its equipment includes a two-coil thermal cracking unit, Alcorn heater, catalytic polymerization unit, and a gas-recovery plant.

French Crude Production

Crude-oil production in France amounted to 26,138 tons, or 196,000 bbl., for the first 6 months of this year compared with 24,636 tons (184,000 bbl.) for the same period in 1947.



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Universal Service Protects Your Refinery

Current Drilling Evokes Interest in Virginia's Only Producing Oil Field

by Philip Jenkins*

SUBSTANTIAL oil seepage, known for many years, led to the original drilling in the Rose Hill area of Lee County, Virginia. As is now rather generally known, the surface geology is the top of an overthrust block of sediments of considerable thickness. In places, due to erosion, the formations beneath this overthrust block are partly exposed. These are called "fensters" (windows) which permit looking through the block of overthrust sediments to the surface beneath the block.†

The first well of which there is any record was drilled in 1915. (See Table 1). In 1922, C. M. Bales drilled a well in the Possum Hollow fenster, which had oil shows. During 1923-26, Charles Butts, working with the United States Geological Survey, realized the possibilities of oil in the area. His work was published in 1927 in Bulletin 28 of the Virginia Geological Survey, and stated that there were probable minor anticlines superimposed on the general structure, which would favor the accumulation of oil and gas.

Between 1924 and 1942, Williamson and Bales drilled seven wells into the Trenton lime (See Table 1), of which six were dry or had only small shows, and one, No. 3 on the map, had some small production.

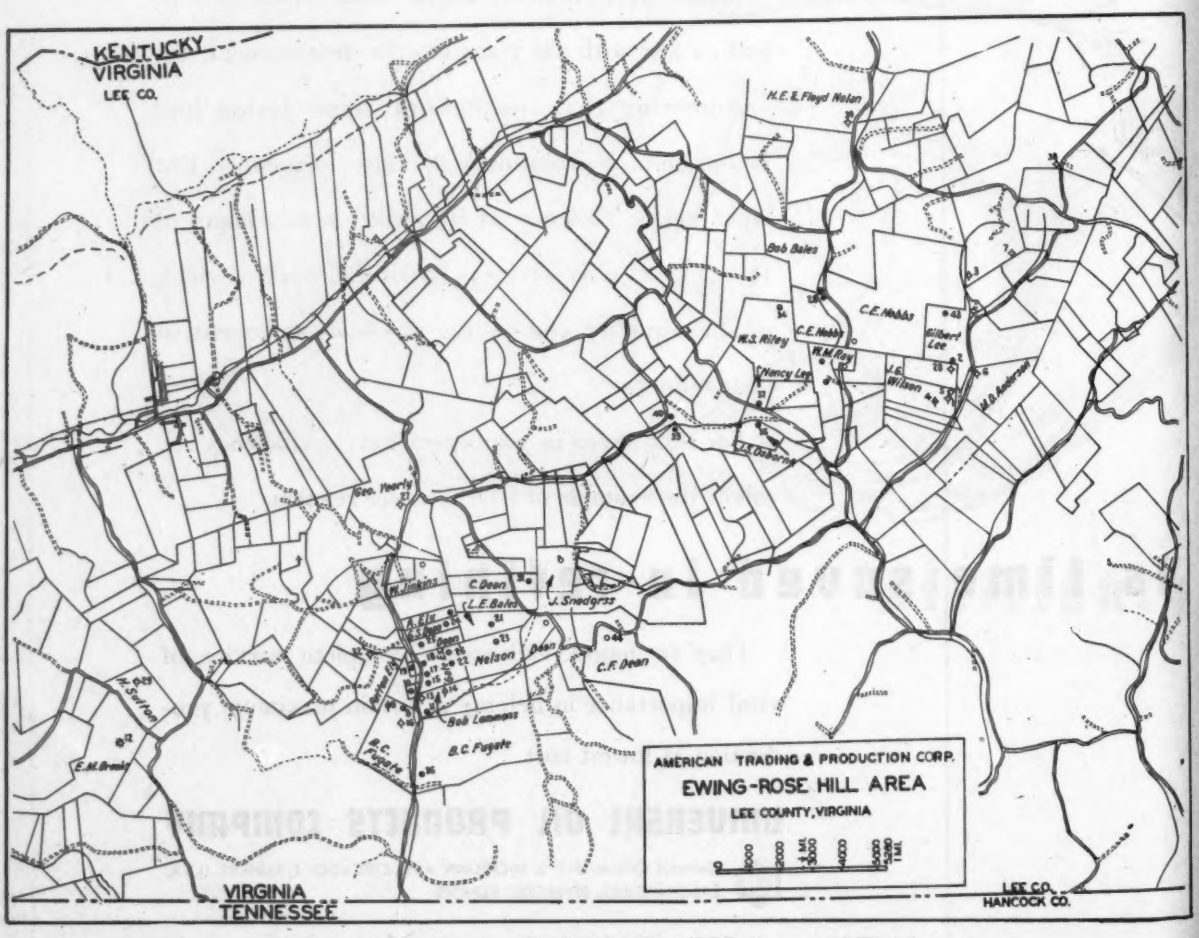
In 1942 Seale Oil Co. drilled the Fugate in the Fourmile fenster, resulting in a 60-bbl. well. Between 1942 and 1946, Seale drilled 6 more wells without much success. In July 1946, Rouge Oil Co. bought Seale Oil Co. and Virginia Lee Oil, Inc. (a holding company). Since then Rouge Oil Co., The American Traders, and a few independents have drilled the rest of the wells.

The drilling is all cable tool, and at the present time, Rouge Oil Co., Ewing, Va., has four strings (three No. 2 Nationals and one No. 5 Star); C. A. Bue, Rose Hill, a No. 36; James Webb, of Allen, Ky., one No. 2 National and one Cardwell; R. A. Mitchell of Rose Hill, Va., has one No. 29 Bucyrus-Erie; Stacey & Cardwell, Rose Hill, have one No. 43 Star and one No. 2 National.

The main drilling problems are due

*Kentucky-West Virginia Gas Co., Prestonburg, Ky.

†Also see "Rose Hill Oil Field, First Production in Virginia and First East of Appalachian Plateau," by Ralph L. Miller, The Oil and Gas Journal, November 8, 1947, p. 78.



Map showing location of wells drilled in Rose Hill-Ewing area of Virginia

TABLE 1—ROSE HILL, EWING, VIRGINIA, AREA, WELL DATA

No. on map	Location—	Initial production (bbl. per day)	Operator and name of well	Date of Comp.	Producing horizon	T.D.	Elev.	Bottom formation	Surface formation
None	4 mi. SW Jonesville	Dry hole	(?), D. C. McClure	1915	None	3,300?	1,395	(?)	Lowville
1	Possum Hollow	3 oil shows	C. C. Bales, Gilbert Lee	1922	None	303	1,430	Clinch sandstone	Clinton shale
2	Possum Hollow	Prod. at bottom	C. M. Bales, Gilbert Lee	1924	Trenton	1,410	1,430	Trenton	Clinton shale
3	Possum Hollow	Dry hole	C. M. Bales, Lon Montgomery	1925	Dry	2,400?	1,455	(?)	Clinton shale
None	7 mi. W. Rose Hill	Dry hole	Wilson, Billy Parker	1928	Dry	2,650	1,460	(?)	Trenton lime
4	Possum Hollow	Dry hole	C. M. Bales, Jack Asher	1929	Dry	900	1,410	(?)	Clinton shale
5	Possum Hollow	Oil show	C. M. Bales, W. B. Fulton	1934	Dry	1,498	1,420	Trenton	Clinton shale
6	Possum Hollow	Dry hole	C. M. Bales, Pritchard	1937	Dry	467	1,460	Clinch	Clinton shale
7	Possum Hollow	Show of gas	C. M. Bales, Bob Ingram	1938	None	1,570	1,570	Trenton	Clinton shale
*8	Fourmile	60	Fitch et al, B. C. Fugate	1942	Trenton	1,115	1,440	Trenton	Sequatchie
9	Fourmile	Dry hole	Fitch et al, B. C. Fugate	1942	Trenton	2,003	1,502	Trenton	Clinch
*10	Fourmile	3½	Fitch et al, B. C. Fugate	1943	Trenton	1,773	1,445	Eggleston	Clinch
11	Fourmile	1	Fitch et al, Bob Lemons	1944	Moccasin	3,261	1,438	Mascot	Sequatchie
†12	1.9 mi. S Ewing	225 M.c.f.	Fitch et al, Eli Brooks	1945	Cayuga	4,079	1,443	Eggleston	Conasauga
*13	Fourmile	7	Fitch et al, Bob Lemons	1945	Trenton	1,222	1,466	Trenton	Sequatchie
14	Fourmile	Dry	Fitch et al, Bob Lemons	1945	Moccasin	1,560	1,531	Moccasin	Clinch
*15	Fourmile	15	Rouge Oil Co., Fugate Estate	1946	Moccasin	1,610	1,518	Moccasin	Clinch
16	Fourmile	Dry	Rouge Oil Co., B. C. Fugate	1946	Eggleston	1,908	1,468	Eggleston	Sequatchie
17	Fourmile	(?)	Rouge Oil Co., Fugate Estate	1946	Trenton	1,235	1,489	Trenton ?	Clinch
*18	Fourmile	50	Rouge Oil Co., Fugate Estate	1946	Trenton	1,320	1,494	Trenton ?	Clinton
*19	Fourmile	200	Rouge Oil Co., Fugate Estate	1946	(?)	1,957	1,490	(?)	Clinton
20	Possum Hollow	Dry	Williamson, Gilbert Lee	1946	(?)	1,889	1,420	(?)	Clinton
*21	Fourmile	Flowed oil	Rouge Oil Co., L. E. Bales	1946	Trenton	1,104	1,530	Trenton	Clinton
*22	Fourmile	20	Rouge Oil Co., Fugate Estate	1946	Trenton	1,769	1,529	Trenton ?	Clinton
23	Fourmile	(?)	Rouge Oil Co., Stacey Nelson	1947	Eggleston	1,540	1,545	Eggleston	Clinton
*24	Fourmile	25	Rouge Oil Co., G. C. Dean	1947	Moccasin	1,742	1,500	Moccasin	Clinton
*25	Fourmile	210	Rouge Oil Co., Josh Dean	1947	(?)	1,800	1,515	(?)	Clinton
*26	Fourmile	20	Rouge Oil Co., Fugate Estate	1947	(?)	2,037	1,555	(?)	Clinton
27	Fourmile	Dry	Rouge Oil Co., George S. Yeary	1947	(?)	(?)	1,588	(?)	Copper Ridge
*‡28	Martins Creek	25	Rouge Oil Co., Charles Hobbs	1947	(?)	1,614	1,347	(?)	Clinton
29	1.7 mi. S Ewing	Dry	Rouge Oil Co., Henly Sutton	1947	Moccasin	2,707	1,502	(?)	Conasauga
30	Martins Creek	Dry	Rouge Oil Co., H. B. Nolan	1947	(?)	(?)	1,370	(?)	Copper Ridge
*31	Fourmile	200	Rouge Oil Co., Joe Dean	1947	Trenton	1,574	1,585	Trenton	Clinton
32	Fourmile	Dry	Stacey et al, Patton Ely	1947	(?)	(?)	1,545	(?)	Maynardville
*33	Martins Creek	100	Rouge Oil Co., Ray	1947		(?)		(?)	
*34	Martins Creek	75	Rouge Oil Co., Riley	1948		(?)		(?)	
*35	Martins Creek	100 after acid	Rouge Oil Co., Osborn		Lowville		1,340	(?)	Clinton
*36	Fourmile	10	Hindman, B. C. Fugate	1947	Lowville	1,800		Lowville	
*37	Martins Creek	30	Hindman, G. E. Lee	1947	Trenton	2,100		Lowville	Copper Ridge
38	Possum Hollow	Dry	Hindman, Smith	1948	Dry	2,190		Lowville	
*39	Martins Creek	3	Hindman, C. Marcum	1948		2,110	1,355	Lowville	Clinton
*40	Martins Creek	15	Rouge Oil Co., Campbell	1948	Trenton	1,500	1,385	Trenton	Clinton
41	Martins Creek		Rouge Oil Co., W. M. Ray						Clinton
42	Martins Creek	Dry	Hindman, Clifford Erie	1948		3,130		Knox	
*43	Possum Hollow	3	American Traders, Gilbert Lee	1947	Trenton				
44	Fourmile		Mitchell, Dean Brothers	1948					

*Produced oil. †Shut-in gas well. ‡Discovery wells.

TABLE 2—REMARKS AND STATUS OF WELLS AS OF JULY 1948

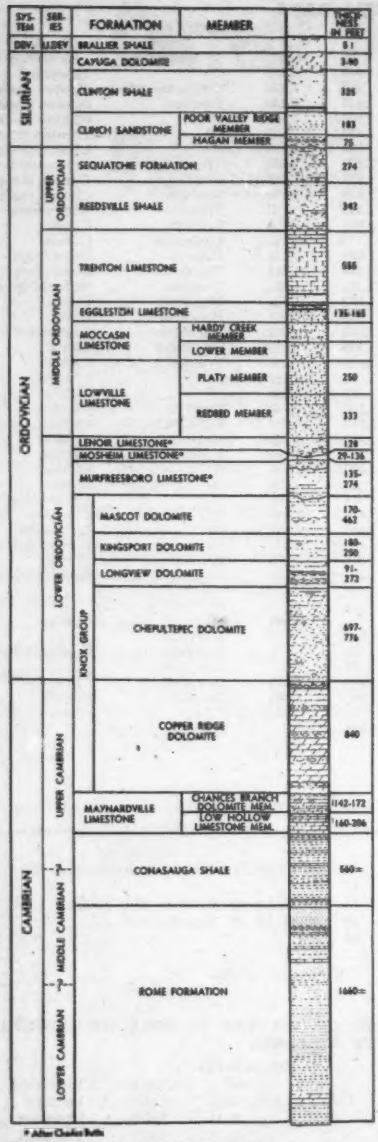
No. on Map	
None	Probably drilled through Pine Mt. fault
1	Shallow—drilled near oil seepage
2	Show of oil
3	No record
None	No record—probably crossed fault plane
4	No record
5	Shows in the Clinton, Clinch, and Trenton
6	Dry—shallow
7	Show of gas in Trenton
*8	Settled to 8 bbl.—making 3 bbl. until last month
9	Oil show Reedsville—lost on acidizing
10	3½ bbl. per day for short time
11	Completed 1939 at 1,445 ft.—deepened in 1944
12	225 M.c.f. Cayuga Dolomite — well shut in
13	7 bbl. in lower part of Trenton
14	Oil show in Trenton
15	15 bbl. top of Moccasin
16	Dry
17	No data released
18	50 bbl. start—dry in 6 months
19	200 bbl. to start—dry in 6 months
20	Dry
21	Now making 5 bbl.
22	20 bbl. to start—now dry
23	(?)
24	Start 25 bbl.—now dry
25	Started 210 bbl.—now making 40 bbl.
26	(?)
27	Cross Pine Mt. Fault 845 ft.
*28	Started 25 bbl.—18 months making 20 bbl.
29	Dry
30	Dry
31	Started 200 bbl.—18 months making 6 bbl. Acidized
32	Dry
33	Started 100 bbl.—6 months making 15 bbl.
34	Started 75 bbl.—4 months making 25 bbl.
35	Acid
36	Started 10 bbl.—making 3 bbl.
37	Lost oil
38	Show in Trenton 1,600 ft.
39	Making 3 bbl.
40	Started 15 bbl.—now making 4 bbl.
41	(?)
42	Drilling at 3,130 in the Knox
43	Shot 60 qt. liquid—lost oil
44	(?)

*Discovery wells.

TABLE 3—WELLS THAT HAVE FOUND SOME OIL OR GAS IN ROSE HILL-EWING AREA, LEE COUNTY, VIRGINIA

Map No.	Pool location—	I.P.	Est. present prod., bbl./day	Comp. date	Producing horizon
8	Fourmile fenster	60	3	1942	Trenton
10	Fourmile fenster	3	0	1943	Trenton
13	Fourmile fenster	7	7	1945	Trenton
15	Fourmile fenster	15	15	1946	Moccasin
18	Fourmile fenster	50	0	1946	Trenton
19	Fourmile fenster	200	0	1946	(?)
21	Fourmile fenster	300	5	1946	Trenton
22	Fourmile fenster	20	0	1946	Trenton
24	Fourmile fenster	25	0	1947	Moccasin
25	Fourmile fenster	210	¶40	1947	(?)
26	Fourmile fenster	20	(?)	1947	(?)
31	Fourmile fenster	200	6	1947	Trenton
36	Fourmile fenster	10	3	1947	Lowville
	13 Wells	1,120	79		
43	Possum Hollow fenster	3	0	1947	Trenton
12	2 Mi. S of Ewing	225,000 gas	shut in	1945	Cayuga
28	Martins Creek fenster	25	*20	1947	(?)
33	Martins Creek fenster	100	†15	1947	(?)
34	Martins Creek fenster	75	‡25	1948	(?)
35	Martins Creek fenster	¶100	§0	1948	Lowville
37	Martins Creek fenster	30	0	1947	Trenton
39	Martins Creek fenster	3	3	1948	Trenton
40	Martins Creek fenster	15	4	1948	(?)
	7 Wells	348	67		
	Total accounted for	....	146	....	.....
	Estimated total	....	200	....	.....
	Unaccounted for	....	54	....	.....

*After producing 18 months. †After producing 6 months. ‡After producing 12 months. ¶Acidized. §Reacidizing.



Columnar section of formations exposed and drilled in vicinity of Rose Hill field

to the caves in the bottom of the Clinton, and the hard, limy, slaty cave in the top of the Trenton. These caves have been stopped successfully with Linco. Otherwise the problem is just hard-rock drilling, making the drilling time 45 to 60 days for a 2,000-ft. hole. Contract-drilling prices are reported to range from $4.50 to $6 per foot.

The amount of casing used varies with different operators. It runs anywhere from one or two joints of 10-in. and enough 8-in. to shut off ground water, up to 13-in. drive pipe, 10-in. to shut off ground water, 8-in. to shut off the caves, and 6-in. on top of the pay.

Producing 200 Bbl.

Active operators at the present time are Rouge Oil Co., Ewing, Va.; G. W. Hindman, Middlesboro, Ky.; Stacey & Cardwell; and American Traders, of Rose Hill, Va.

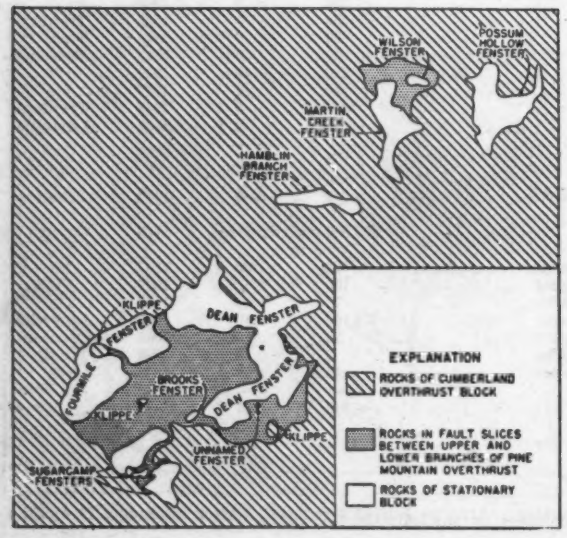
Production is running about 200 bbl. per day for the area, the oil being sold to the Elk Refining Co. plant at Falling Rock, W. Va., near Charleston, and to Gilley Oil Refinery at a price of $4.12 per barrel on the lease. Rouge has the bulk of the production; G. W. Hindman et al being the only other producer.

Individual well estimates, which do not necessarily add up to the same as the daily average for the field as a whole, are 3 bbl. daily each from Hindman's Fugate (No. 36 on table and map), and Marcum (No. 39). For Rouge, estimates are 20 bbl. from the Hobbs (No. 28); Bales 5 bbl. (No. 21); Riley 25 bbl. (No. 34); Rea 20 bbl. (No. 33); Osborne 15 bbl. (No. 35); Campbell 15 bbl. (No. 40); Dean 40 bbl. (No. 31); all other wells estimated 70 bbl. total per day.

The best wells in the field are the Riley (No. 34), drilled in 1 year ago and still making 30 bbl. daily; the Rea (No. 33), which came in for 100 bbl., and is making 20 bbl. after 6 months; and the Hobbs (No. 28), initial production 25 bbl., still making 20 bbl. after 18 months.

Recently Rouge acidized one well successfully (the Dean, No. 31). It was making 3 bbl., and was first treated with 2,000 gal. without success. It was then reacidized with 4,000 gal. and started out at 550 bbl. per day, dropping to 40 bbl. after 4 weeks. The Osborne (No. 35), with only a show when drilled in, was acidized with 4,000 gal. The well started off with 100 bbl. per day, but was soon depleted. It was then reacidized with 10,000 gal., and at the time of writing this account, was still swabbing acid. Rouge Oil Co. and G. W. Hindman are planning to treat as many wells as possible. Dowell Chemical Co., of Hamilton, Ohio, has done all of the acidizing up to the present time.

The pay in the Trenton lime is generally 10 to 15 ft. of saturation, while in the Lowville, the pay shows 4 to 5 ft. of saturation. The geology has been discussed in "Fensters in the Cumberland Overthrust Block in Southwestern Virginia," by Charles Butts, Virginia Geological Survey Bulletin No. 28; in Preliminary Map No. 76 (2 sheets), U. S. Geological Survey, by Miller and Fuller; and in Volume 3, Structure of Typical American Oil Fields, American Association of Petroleum Geologists.



Map showing outcrop areas of Cumberland overthrust block, fault slices, and stationary block in vicinity of Rose Hill oil field. Map also shows names of inner fensters. (Courtesy A.A.P.G.)

Louisiana Will Review Offshore Allowable Rule

BATON ROUGE, La.—The question of appropriate allowables for oil production in the Gulf of Mexico will be considered in a hearing here August 24 by S. L. Digby, state conservation commissioner.

The matter has become increasingly important as a result of increased offshore drilling activity. Kerr-McGee Oil Industries, Inc., was granted a temporary 400-bbl. daily allowable for its Block 32 producer. This considerably higher allowable was given in recognition of the high costs of offshore operations. Other discoveries in the Gulf have been Superior Oil Co. of California's condensate producer and last week's oil producers by the California Co. and Humble Oil & Refining Co.

Secondary Plans Approved

AUSTIN.—The Texas Railroad Commission has authorized secondary-recovery operations in Agua Dulce field, Nueces County, and in South Ward field, Ward County.

L. M. Lockhart was granted permission to conduct pressure-maintenance operations in the Wright sand reservoir in Agua Dulce through the use of gas injected in the gas cap. Standard Oil Co. of Texas was given authority to conduct experimental water flooding for 1 year in the Bennett sand underlying its Durgin lease in South Ward field.

Another commission order found that Blucher field, Jim Wells County, and Tijerina-Canales field are producing from a common reservoir. The two fields were ordered combined into a field to be known as Tijerina-Canales-Blucher.

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WASHINGTON WATCHING

BY BERTRAM F. LINZ

Who's Profiteering Now?

WASHINGTON.—The Truman administration is definitely opposed to any action on the part of industry that would lead to further inflation. But the Interior Department apparently figures that doesn't apply to government operations.

The amount of oil affected by the department's operations is admittedly an infinitesimal part of our total production but the policies followed, if adopted by the oid industry itself, undoubtedly would lead to stronger demands than ever for price controls.

Under the regulations now in effect, government royalty oil is offered for sale to the highest bidder and offers generally are in excess of the posted prices for comparable oil. New regulations providing that the oil may be sold at the market to small refiners coming under the O'Mahoney Act have been suggested, but have not yet been adopted.

The department also offers leases to bidders paying the highest bonuses, another form of premium.

There is some thinking in the department, too, that the Government should get something from the oil being produced on acquired lands to which it does not yet hold the mineral rights.

In the sale to the Government of some of the lands acquired during the war, the original owners retained the mineral rights for a specified period, generally 10 years. In some cases, oil is being produced on these lands and the Government will get no royalty until it acquires the mineral rights a few years hence upon expiration of the reservations. It has been suggested that the Government ought to have an overriding royalty on this production, although so far nobody has been able to come up with a formula whereby it can levy a toll on something it doesn't own.

Given an overriding royalty on this production it might be easy to get an overriding interest in all oil produced, on the ground that, in the event of another emergency, the Government might acquire the land from which it is being taken.

When a premium of any sort is paid a producer on private lands it is inflationary, but when the premium is paid to the Government it apparently is efficiency.

New Faces

THE oil and gas industry may have to deal next year with a Senate interstate commerce committee much different from that with which it has been familiar over the past several years.

Three members, Chairman Wallace H. White, Jr., of Maine, and Senators E. H. Moore of Oklahoma and Albert W. Hawkes of New Jersey, are resigning, depriving the committee of three of its outstanding experts, Moore's main interest being oil and gas, White's radio and communications, and Hawkes' problems of companies.

If the Republicans retain their control of the Senate, Charles W. Tobey of New Hampshire is in line for the chairmanship, but since Tobey now is chairman of the important banking and currency committee, he might not want to take the job, which would then fall to Clyde M. Reed of Kansas, whose chief interests include oil and gas.

Should the Democrats regain control of the Senate, which is far from impossible, either Edwin C. Johnson of Colorado or Ernest W. McFarland of Arizona would become chairman, depending on the Colorado vote. Johnson is ranking minority member and is up for reelection, with a good chance of winning. McFarland, who is third on the Democratic side, is safe until 1953. Second ranking minority member was Tom Stewart of Tennessee, who was washed out in the state primaries.

Already it is definite that four of the 13 men on the committee will not come back next year, and there may be other changes as the result of the November elections. There is considerable interest in the race Rep. Ross Rizley of Oklahoma is making for the Senate seat now held by Ed Moore since, if he wins, he is expected to seek a place on the committee because of his deep interest in oil and gas problems.

Steel Costs

ALTHOUGH steel prices have risen materially, the industry claims the advance since 1939 has been less than that in any other industry.

Tubular goods used by the oil industry cost more because the things that enter into it cost more, according to steel statisticians who point out that the cost of fuel oil as of May 1 was 193 per cent above the average 1936-39 price. When bought in the volume the steel companies require, the increase of 1 cent a gallon in the cost of fuel oil adds up to $20,000,000 a year.

It costs 2½ times the prewar figure to build a pipe mile, a considerably greater increase than recorded in any other construction item. The total increase in the annual cost of only some of the major items needed in iron and steel production has already reached $500,000,000 since the first of the year, it is declared.

The cost of raw materials runs 15 to 461 per cent above the 1936-39 average, and freight rates are up 27 to 62 per cent. The latest wage increase, granted July 16, will add at least $175,000,000 a year to costs if it becomes industry-wide, as it probably will, and will bring the industry payroll to close to $3,000,000,000 a year.

Last year, steel industry sales were something over $7,000,000,000, wages were $2,601,000,000, and net earnings after all charges were $447,000,000. This was a return of 9.4 per cent on the industry's $5,000,000,000 investment and 6.3 per cent on sales. Company dividends were $193,900,000, an increase of $34,000,000 over 1946 and close to three times the 1939 dividends.

Paper Is Cheap

ONE of the nice things about the running fight between the Democratic administration and the Republican majority in Congress is that the public gets a chance to read a lot of letters it otherwise wouldn't see.

For some months, whenever a Republican congressman got something he could needle an administration official with, he has been writing letters, which he makes public. Not to be outdone, the official writes his answer, usually sarcastic, on a mimeograph. All at government expense, of course.

Thus, when the staff of the House small business committee figured that last year, under the export control program, Sweden got 286,560 tons of steel and products, Committee Chairman Walter C. Ploeser of Missouri wrote a letter to Secretary of Commerce Charles Sawyer, expressing his "amazement" and suggesting that, in view of the domestic shortage of steel, it was time to cut down on the export quotas, particularly for steel which might find its way into the hands of nations not friendly to the European Recovery Program.

"Relax," mimeographed Sawyer right back at him, "for the current year exports of steel to Sweden licensed for shipment were 28,000 tons for the first quarter and 19,000 tons for the second quarter, a reduction which is continuing and which I am sure you will agree is very substantial."

Not to be outdone by a congres-

sional committee, the secretary assured Ploeser that he, too, is concerned over the plight of the small businessman. But, he said, "only the valor of ignorance would suggest as a solution to the problem that we completely eliminate exports to other countries."

Thus, at a cost of 4 stencils, a little ink and probably not more than a ream of paper, a great issue was raised and resolved, two great political parties got some publicity and the public got a chance to see what's back of the scenes in Washington.

One Inflation Curb

BELIEVE it or not, but it may be possible soon to buy a new automobile from a new-car dealer at list price instead of having to slip a used-car salesman $500 to $1,000 over list for a "used" machine that has traveled 3 miles.

This happy return to normalcy may be the result of legislation enacted by Congress which permits the Federal Reserve Board to put the screws on installment credit.

If, as expected, the board dusts off the installment-credit restrictions in force during the war, it will no longer be possible to buy a used car on time if a premium price is involved. The new regulations are expected to provide that used cars can be financed only at prices representing the average price quoted in approved appraisal books.

The new regulations will mean end of the lush days the used-car dealers have been enjoying, and they may be the first business men to be whittled down to prewar size.

The legislation, however, will not apply to the installment selling of industrial equipment.

But the new regulations also will affect other lines of business, too, among them the oil-equipment sellers who no longer will be able to offer oil-burners on a nothing down and so much a month basis.

House ICC Group Leaves for 2-Week Survey of Mexican Oil Operations

WASHINGTON. — Members of the House interstate commerce committee left this week for a survey of the Mexican oil situation which had been deferred because of the special session of Congress.

The committee expects to be in Mexico for about 2 weeks, during which time it will discuss oil development problems with Mexican officials and make first-hand studies of some of the oil fields.

It is expected that the committee will discuss Mexico's program for developing new resources through the medium of United States companies, which has been under consideration for many months. None of the large companies, however, has indicated any interest in contracts for exploration and development on the basis the Mexican government has laid down, and the government, on its part, has given no intimation of any willingness to relax its requirements.

It is understood that there have been no conversations with the large companies for some time, and the Mexican government is concentrating on The Texas Co. and Cities Service Oil Co. agreements and possibly is considering new drilling contracts.

Committee Chairman Charles A. Wolverton of New Jersey announced the committee would be accompanied by Robert H. S. Eakens, chief of the petroleum division of the State Department, and representatives of the War Department as consultants, as well as by attaches from the Mexican embassy in Washington. The Army provided air transport and the group will be the guests of the Mexican Government.

As the committee prepared to leave Washington, Wolverton said its intensive study of the oil shortage has convinced it that "Mexico has been neglected as a potential source" of oil although "it is known that vast reserves of petroleum exist in that country and it should be a very logical and substantial source of supply.

"Just what is necessary for developing Mexican petroleum resources, and what assistance can be given such a program, is a matter of prime consideration on the part of the committee," he said.

Direct U. S. S. R. Talks on Patent Claims Asked

WASHINGTON. — Unsuccessful in securing discussion of settlement of Russia's $11,296,000,000 lend-lease account, the State Department has suggested that claims for royalties on refinery patents used by the Soviet during the war be taken up directly with the Russian Government.

Approximately $14,500,000 is due eight corporations which permitted Russia to use their special cracking, refining and other processes in setting up four complete refineries shipped by this government during the war under lend-lease. The companies have asked the Government to pay their bill, which it is perfectly willing to do if it can arrive at any settlement of the lend-lease account with Russia. It is understood that all four of the refineries were completed and are in operation.

The concerns involved are Houdry Process Corp., Philadelphia; Universal Oil Products Co., Chicago; International Catalytic Oil Processes Corp., New York; Petrolite Corp., Ltd., Los Angeles; Statford Development Corp., Kansas City; Texas Development Corp., New York; Max B. Miller & Co., Inc., New York, and Girdler Corp., Louisville.

The State Department has approached the Russian Government several times with suggestions that the lend-lease account be settled, but without success. The account involves not only the refinery patents, but the refineries themselves, other oil equipment, and petroleum products supplied the Russians during the war.

Next Week

Aerial photography is providing a rapid and efficient means of geological reconnaissance, particularly in regions where rock exposures occur at the surface. An article in next week's issue will present the case of this oil-exploration tool, which is helping to find the new discoveries needed to keep pace with the increasing demand for petroleum.

Recent developments and improvements in drilling fluids provide the subject of another article, by a major-company engineer, while another m.c.e. discusses gas lift as a production tool. He presents an interesting comparison of gas lift and rod pumping in the same field, illuminating his facts with many diagrams and charts.

Refining articles include a discussion of the new T.P.C. process—Thermofor Pyrolytic Cracking—which is closely akin to T.C.C. It was developed by Socony-Vacuum's laboratories, and several important advantages are claimed for it. Another tells of "engineered maintenance" at Pan American's Texas City refinery, while a third describes what Sunray has done in revising equipment at the Duncan, Okla., plant acquired last year.

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PERSONALS

Socony Names Danner Process Promotion Head

AFTER almost 4 years with Houdry Process Corp., an affiliate of Socony-Vacuum Oil Co., Inc., as executive vice president, Arthur V. Danner has returned to Socony-Vacuum and is the newly elected manager of process promotion. Clark S. Teitsworth, director in charge of manufacturing for Socony-Vacuum, made the announcement.

Danner joined Socony-Vacuum as a lawyer in the patent department in 1937. During the war he was loaned to the Petroleum Administration for War where he was chief of the process section from 1942 to 1944.

Danner graduated from Georgetown University with a B.S. degree in chemistry and later studied at New York University where he obtained a L.L.B. degree in law. He is a member of the bar in New York and Washington, D. C.

In his new position Danner will be in charge of new developments in the lubricating field, petro-chemical activities and other phases of petroleum refining.

L. O. Thompson, formerly on the geological staff of the division headquarters in Midland, Tex., for Standard Oil Co. of Texas, has joined Slick Oil Co. and Slick-Urschel Oil Co. as geologist in the Permian basin. Both the latter companies will establish district offices in Midland as soon as a new building under construction is completed there.

A. H. Hayes, superintendent of the light oils division of the Whiting refinery of Standard Oil Co. (Ind.) since 1946, has been named assistant general superintendent of the refinery to succeed **J. C. Ducommun,** who was recently promoted to manager of the refinery. Hayes, who received a master's degree in chemical engineering from the Massachusetts Institute of Technology, joined the company in 1930 as a chemist in the Whiting research laboratory.

Oscar L. Hatcher, consulting geologist of Tulsa, has joined Oklahoma Natural Gas Co. as chief geologist to fill a post that has been vacant for more than a year.

J. D. Aimer has been appointed chief geologist for Root Petroleum Co. effective August 15. For the past 4 years he had been division geologist for a major oil company.

Walter E. Black, division manager of Esso Standard Oil Co. of Pennsylvania, has been named Pennsylvania state chairman of the Oil Industry Information Committee to succeed **Henri J. Drucquer,** who has been transferred to New York.

Cecil Lanier, Oklahoma district landman for Magnolia Petroleum Co. at Oklahoma City and with the company for 21 years in Texas and Illinois, has resigned effective August 15 to become an independent. He will be succeeded by **John T. Jones,** transferred from Midland, Tex. **Pat Duncan,** formerly assistant at Midland, has been made district landman.

Donald S. McBride, engineer for Tide Water Associated Oil Co., has been transferred from Oklahoma City to Kilgore, Tex.

Fred Zimmer, who recently spent 2 months in Petrolia, Ont., and vicinity, has returned to Trinidad, B.W.I., where he is drilling for a large oil company.

J. H. Singleton, formerly assistant chief accountant for Shell Pipe Line Corp., has been named chief accountant.

J. B. Creswell, landman for Tide Water Associated Oil Co. at Jackson, Miss., has transferred to the company's West Texas district office at Midland, Tex.

C. L. Mayhall, vice president in charge of sales of Anderson-Prichard Oil Co., has been named manager of the company's new retail division following the recent purchase of Prichard Oil Co.

Jack A. Fleming, former Toronto newspaperman, has been appointed supervisor of the public relations department of Union Gas Co. of Canada, Ltd., with headquarters at Chatham, Ont.

Robert Scholl, former partner in a Mt. Pleasant, Mich., pipe pulling service, has joined the geological survey division, Department of Conservation, as petroleum engineer.

John M. B. Howard, formerly with Standard Oil Co. (N. J.) in its worldwide marine operations, has been appointed assistant manager of Standard-Vacuum Oil Co.'s marine department. Howard's most recent assignment was in London, as assistant general manager of Esso Transportation Co., a Jersey Standard affiliate. He started his career as a deck officer in 1933 and since that time has occupied important shore posts at well-known ports. He will assist **W. F. Dunning,** manager of the department.

Stanley R. Wilson, in charge of the contract department for Universal Oil Products Co., has been appointed secretary of the company. Wilson joined Universal in 1922 after graduating from the University of Illinois in industrial and mechanical engineering. His experience was not confined to the United States alone. For several years he represented Universal abroad, with headquarters in London. Later as administrative assistant in the Chicago office assigned to contract and financial problems, he continued to handle foreign work. During the war Wilson was in charge of all the company's contract negotiations with the Government.

Luther Tolbert, assistant superintendent of pipe lines for Lone Star Gas Co., has been named superintendent to succeed **R. Vandercook,** who has resigned. Tolbert joined Lone Star in 1920 and in 1927 was promoted to assistant superintendent in charge of construction and general operations of the pipe-line department. **R. N. Carpenter,** formerly district foreman at Ranger, Tex., has been named to succeed Tolbert as assistant superintendent. As a result of these promotions other advancements in the pipe-line department include: **Herman B. Dempsey,** formerly foreman of Ballinger pipe line dis-

PERSONALS

trict, succeeds Carpenter as foreman of Ranger district; **Garland M. Hargus,** formerly district foreman at Groesbeck, succeeds Dempsey; and **George F. Connelly,** assistant foreman at Fort Worth district, succeeds Hargus.

Walter J. Levy, who during the war was chief of the Office of Strategic Services' petroleum section, and served on the committee on enemy oil, an intelligence group under the Joint Chiefs of Staff, has been appointed head of the petroleum oil and lubricant office of the Economic Cooperation Administration.

Charles K. Clark, division geologist of the eastern producing division for Pure Oil Co., has joined Michigan Oil Co., Saginaw, Mich., and will assume his duties effective September 1. A past president of the Michigan Geological Society and business representative of the American Association of Petroleum Geologists for Michigan, Clark has been geologist and geophysical consultant for Pure Oil Co. since 1930. He is a graduate of Ohio State University, and a member of the Michigan Academy of Science.

A. D. Turquette, formerly assistant district geologist at Oklahoma City for Phillips Petroleum Co., has resigned to become assistant division geologist for Globe Oil & Refining Co. at Oklahoma City.

Maury Walters, vice president and director of Refiners Service, Inc., has resigned and will devote most of his time to his duties with Lakeside Refining Co., Kalamazoo, Mich. He will continue to act in an advisory capacity for Refiners Service.

Guy L. Ritchie has been promoted to division tax agent, central division, The Texas Co., with headquarters in Lawrenceville, Ill. Ritchie, who succeeds **D. G. Siemer,** retired, formerly was assistant division tax agent.

Charles R. Brown, assistant to the president of Tide Water Associated Oil Co. and a member of the company's western division operating committee, has been appointed vice president of the company. He will continue his administrative duties with direct responsibility for many of Tide Water's administrative departments in the western division. Brown joined the company more than 31 years ago.

Gordon Hurd, geologist for Continental Oil Co. at Denver, Colo., has resigned to become a consultant there.

James E. Coleman, formerly assistant sales manager, has been named assistant purchasing agent for the Pittsburgh group of associated natural-gas companies in Columbia Gas System, Inc.

Dr. O. E. Bransky, recently retired as general manager of the Standard Oil Co. (Ind.) manufacturing department, has joined the petroleum division of the Economic Cooperation Administration.

Fourteen new junior exploitation engineers, junior geophysicists, and junior geologists have been added to the Shell Oil Co., Inc., organization and assigned for the time being to the regional staff office in Houston. Junior geophysicists are **E. H. Anderson, H. T. Austin, H. B. Shirley, J. K. Nelson, W. R. Strickler,** and **C. A. Wood.** Junior geologists are **C. L. Espy, V. J. Kennedy, L. H. Van Dyke, C. J. Barkley,** and **C. W. Van Vleet.** Junion exploitation engineers are **R. P. Haddox, O. J. Shirley,** and **L. Sistruck.** Another new Shell employe is **E. W. Wallace** who has joined the production department as a mechanical engineer with the regional staff in Houston.

Walter Ruska, of Ruska Instrument Corp., has left for Oslo, Norway, where he will attend the eighth general assembly of the national research council of the International Union of Geodesy and Geophysics. He will act as a delegate of the Society of Exploration Geophysicists.

J. T. Breithaupt, mechanical engineer for Shell Oil Co., Inc., has been promoted to division mechanical engineer in the production department and transferred from Eagle Lake to Corpus Christi, Tex. Other promotions and transfers in the company's production and exploration departments include: **R. R. Barr,** driller, Sheridan, to drilling foreman at Seeligson; **R. F. Beery,** senior production engineer, Premont to Kilgore; **C. A. Brooks,** senior production engineer, Eagle Lake to Houston; **A. M. Bruner,** geologist, Tulsa, to regional staff, Houston; **G. H. Calhoun,** division mechanical engineer, Houston to Kilgore; **R. J. Dodson,** senior production engineer to division production engineer, Houston to Corpus Christi.

R. L. Gibson, production engineer, Houston to Corpus Christi; **L. D. Hillyer,** production engineer, Conroe to Houston; **A. K. Korn,** senior production engineer to division production engineer, Kilgore to Houston; **C. H. Miller, F. C. Moore,** and **R. B. Nelson,** drillers, Sheridan to Seeligson; **M. W. Pape,** district superintendent, to district foreman, Nome to Eagle Lake; **F. G. Phillips,** senior production engineer, Conroe to Houston; **G. D. Robertson,** division production engineer, South Texas division, to division manager, Houston division.

A. T. Rylands, senior engineer, Oklahoma City, to division manager, Corpus Christi; **C. H. Taylor,** division mechanical engineer, Kilgore, to division production superintendent, Houston; **R. J. Thorson,** junior chemical engineer, Sheridan cycling plant to Houston; **L. H. Ward,** driller, Sheridan to Seeligson; and **W. W. Watkins,** production foreman, Nome to Sheridan headquarters.

Dr. Charles Rasor, field geologist for a mining company in Arizona; **J. P. Brand,** Miami University, Oxford, Ohio; **William C. Irvin,** University of Illinois; **Charles Renfro,** geological association of Arkansas; **G. Frederick Warren,** geologist with a steel company in California; and **Theodor Alexander,** graduate of Texas Technological College, Lubbock, Tex., have been named to the faculty in the geological department of Texas Technological College. The new staff members will report in September.

Robert B. Campbell, consulting geologist at Gulf Hammock, Fla., is attending the eighteenth International Geological Congress in London as a representative of the Florida Academy of Sciences.

D. J. Smith, president of Pan American Petroleum & Transport Co., has announced the election of the following six new directors of that company's associated operating companies: **Dr. H. R. Snow,** manager of the company's main refinery at Texas City, has been elected a director of both Pan American Refining Corp. and Mexican Petroleum Corp. of Georgia; **A. A. Corona,** vice president of Pan American Petroleum & Transport Co., has been elected director of Pan American Production Co.; **P. J. Sweeny,** first vice president of Pan American Refining Corp., has been elected director of Pan American Gas Co.; **L. W. Moore,** general manager of manufacturing, Pan American Refining Corp., has been elected director of Pan American Pipe Line Co.; **Harold Decker,** vice president and director of Pan American Production Co. and Pan American Gas Co., has been elected a member of the executive committee for both companies; and **R. H. Maupin,** director of Pan American Pipe Line Co., has been elected a member of the executive committee of that company.

Robert M. Caywood, who received his master's degree in petroleum engineering at the University of Oklahoma recently, has joined Anderson-Prichard Oil Corp. as petroleum engineer at Oklahoma City.

J. H. Galloway, formerly district superintendent for Humble Oil & Refining Co. for the Means district at Andrews, has been moved to California where he is head of the company's new district production department there. He is succeeded by **M. M. Jones,** formerly in the company's East Texas division. **C. N. Hunt, Jr.,** formerly assistant superintendent of the Wink district, has been moved to the East Texas division as assistant superintendent of the Pickton district; and **Delma Baucum,** formerly of the Government Wells district of the Southwest Texas division for Humble, succeeds Hunt.

R. J. Kaul, formerly assistant to the New Jersey Works manager, **Donald L. Ferguson,** for Esso Standard Oil Co., has been named manager of the operations and planning division, chemical products department at New York. He has been succeeded by **C. J. Bitzer,** who has been assistant manager of the coordination and planning division of the chemical products department at New York.

Frank Lindeman, Jr., assistant production superintendent for the Texas-Louisiana Gulf Coast division for Stanolind Oil & Gas Co., has been placed in charge of all offshore operations for the company. A graduate of Colorado School of Mines, Lindeman joined Stanolind in 1933. He was named assistant division production superintendent at Houston in 1947. Other appointments to the new offshore supervisory group were **Lawrence T. Haugen,** formerly construction superintendent of the manufacturing department for Stanolind in Tulsa, as marine superintendent; and **Thomas E. Boyce,** retired Rear Admiral of the Navy, as marine operating superintendent. **Samuel C. Oliphant,** formerly acting assistant division production superintendent in charge of onshore operations in the Gulf Coast division, has been named assistant division superintendent. Oliphant, who joined the company in 1940, was district superintendent at Corpus Christi prior to his transfer to Houston recently.

Dr. C. R. Wagner, vice president in charge of research and development for General Aniline & Film Corp. for the past year, has been elected vice president in charge of operations for the company. Formerly a consultant on petroleum and organic chemistry, Wagner for several years was director of research and a member of the manufacturing committee of Pure Oil Co. During the war he served with the Petroleum Administration for War.

Joseph S. Oppo, assistant director of the Maritime Commission's tanker division during the war, has been named chief of the tanker branch of the transportation division of the Economic Cooperation Administration.

SHIFTS—

Jerry Deevers, superintendent, Rocky Mountain Drilling Co., Brea to Westminster, Calif.; **C. L. Reasoner, Jr.,** engineer, Standard Oil Co. of California, Bakersfield to La Mirada, Calif.; **E. N. Mitchell,** superintendent, Rocky Mountain Drilling Co., Long Beach to Ventura, Calif.; **Alfred S. King,** engineer, Houdry Process Corp., Los Angeles to Long Beach, Calif.; **D. T. Coker,** superintendent, Rocky Mountain Drilling Co., Newhall to Bakersfield, Calif.

Charles L. Heald, geologist, United Geophysical Co., Sheridan, Wyo., to Aztec, N. M.; **W. H. Barkey,** superintendent, J. O. Clark, Mission to McAllen, Tex.; **R. N. Bills,** geologist, Amerada Petroleum Corp., Victoria to Cleveland, Tex.; **W. H. Kilpatrick,** engineer, Phillips Petroleum Co., Borger, Tex., to Denver, Colo.; **Roy Norvell,** engineer, Southwestern Public Service Co., Dalhart to Dallas, Tex.

Thomas J. Jeffrey, engineer, Atlantic Refining Co., Dallas, Tex., to Tulsa; **Miller Quarles,** geologist, United Geophysical Co., Freer to Dallas, Tex.; **H. M. Krause, Jr.,** engineer, Humble Oil & Refining Co., Houston, Tex., to New Orleans, La.; **O. L. Chenoweth, Jr.,** superintendent, Montex Drilling Co., and **W. A. Mancrief,** Levelland to Brownfield, Tex.; **J. L. McAdams,** geologist, Bishop Oil Co., Lubbock to Wichita Falls, Tex.

S. T. Duree, superintendent, Cities Service Oil Co., Victoria to Houston, Tex.; **L. C. Jarrell,** engineer, The Texas Co., Columbia, La., to Velma, Okla.; **G. H. Summers,** foreman, Continental Oil Co., Grand Isle to Lake Charles, La.; **Loyd Burson,** superintendent, Wheless Drilling Co., Vacherie, La., to Carthage, Tex.; **John M. Sturdevant,** geologist, Geophysical Service, Inc., Houma, La., to Dallas, Tex.; **George F. Adams,** engineer, Universal Oil Products Co., LaGrange to Riverside, Ill.

D. W. Long, engineer, Universal Oil Products Co., Chicago, Ill., to Monterey Park, Calif.; **Arthur D. Fox,** engineer, Sun Oil Co. Henderson to Robards, Ky.; **W. C. Patton,** superintendent, General Geophysical Co., Henderson, Ky., to Stillwater, Okla.; **J. W. Cromwell,** superintendent, Helmerich & Payne, Inc., Great Bend, Kans., to Oklahoma City; **Herbert Benge,** superintendent, Helmerich & Payne, Inc., Marlow to Elk City, Okla.; **T. W. Mahoney,** superintendent, Helmerich & Payne, Inc., Russell to Great Bend, Kans.

Mont Mills, superintendent, Helmerich & Payne, Inc., Great Bend, Kans., to Oklahoma City; **G. E. Wegner,** foreman, Helmerich & Payne, Inc., Great Bend, Kans., to Chickasha, Okla.; **John V. Morgan,** engineer, Stanolind Oil & Gas Co., Stafford to Ellinwood, Kans.; **C. T. Rankin,** foreman, Amerada Petroleum Corp., Guthrie, Okla., to Stephenville, Tex.; **James W. Rockhold,** engineer, The Texas Co., Kiefer, Okla., to Raymond, Kans.; **J. I. Hull,** superintendent, Zephyr Drilling Co., Pauls Valley to Oklahoma City; **William P. Whitmore,** engineer, Skelly Oil Co., Velma to Tulsa; **Harvey J. Stone,** superintendent, Norbla Oil Co., Tulsa to Oklahoma City.

DEATHS

Walter J. Harris, 68, who is believed to have drilled the first oil test in Andrews County, Texas, more than 25 years ago, died August 7 in Andrews, Tex.

Bernard Richard Luscher, 65, Houston independent oil operator, died August 11 in Houston.

Lloyd S. Powell, 74, oil producer of the Pennsylvania area, died August 8 in Bradford, Pa.

Edgar A. Holbein, 67, retired director and vice president of Standard Oil Co. of New Jersey (now Esso Standard Oil Co.), died August 11 in Bronxville, N. Y. He also served as president of Standard Oil Co. of Pennsylvania (now Esso Standard Oil Co. of Pennsylvania).

Ward M. Dennis, president of Hershey Oil Co., died August 8 in Wichita, Kans.

Elmer Kohlhorst, 44, safety engineer for The Texas Co., died August 14 in Tulsa.

Oscar L. Peterson, 56, president of George C. Peterson Co., Chicago, Ill., died recently in Chicago.

Benton Unit

by H. W. Manley

WHEN The Oil and Gas Journal published the first article on the Benton Unit cycling operation, its editors entitled it *"Benton Unit Approaches the Ideal Cycling Unit."* The second article the Journal published on it included the heading . . . *"A Standout Cooperative Enterprise On Unitization of Gas-Condensate Properties."* These descriptions were rather well founded, as from the time the discovery well tested high-pressure gas and condensate, the thoughts and efforts of operations in the field have been directed toward ultimate cycling.

The story of the new Benton Unit cycling operation (Bossier Parish, Louisiana, 15 miles northeast of Shreveport), however, would be incomplete without an adequate description of the plant equipment and processing units themselves. The owners (Barnsdall, as unit operator, Sohio, Vaughn interests, E. E. Hurley, Union Producing Co., et al as nonoperators) were desirous of doing as thorough and complete a job on the plant and surface equipment end as had been pursued in the preceding field development, reservoir engineering, and unitization phases.*

Summary of Equipment and Processing Layout

Before going into the step-by-step processing and equipment layout in the Benton plant, some high spots of the different plant phases are in order that will illustrate the general engineering planning and design that were employed.

Gas capacity and gas handling.—The Benton cycling plant is designed to handle 50,000,000 cu. ft. per day of produced gas, approximately 45,000,000 of which comes from the distillate-producing formation (sand "D") and approximately 5,000,000 from the oil-distillate-producing formation (Bodcaw sand). The former gas enters the plant at about 2,000 psi. and the latter at about 500 psi. After absorption, both of these gas streams are boosted to a pressure of approximately 3,900 psi. for injection back into their respective producing formations.

Liquid extraction.—The plant is designed to recover and store in liquid form no less than 35 per cent of the propane, 80 per cent of the butanes, and 98 per cent of the pentanes plus contained in the total produced gas. The products are propane, mixed butanes, natural gasoline, motor fuel, kerosine, gas oil, and distillate oil bottoms.

Field wells to plant.—Production-engineering correlation of seismic structure and subsurface geologic interpretations prior to locating test wells helped the Benton Unit to have the minimum of producing wells. The location of the plant site and design of production field system were made with the objective of being able to test any well in the field **with full-scale test separator conditions** at the plant site for a 24-hour period without interrupting the production from the other producing wells. Subsurface material balances and "sweep" pattern efficiencies are consequently greatly simplified for continuous ob-

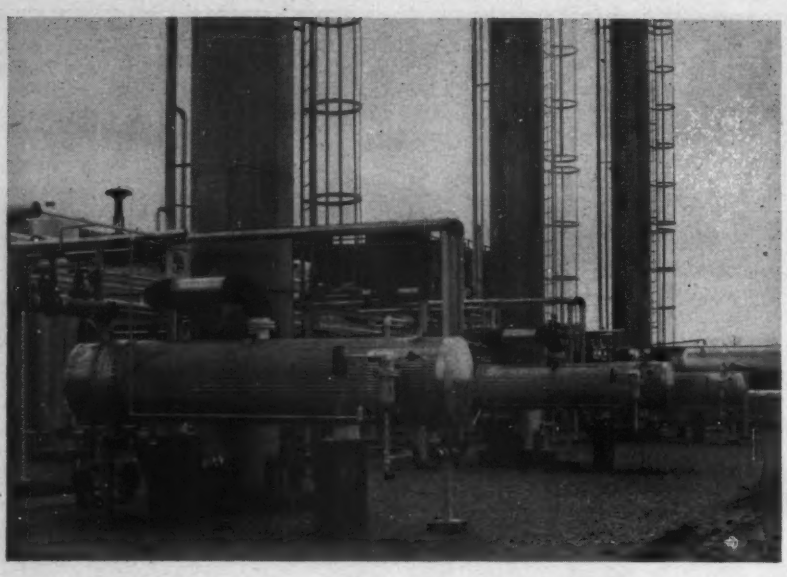
*"Benton Unit Approaches the Ideal Cycling Project," by George Weber, The Oil and Gas Journal, January 11, 1947, p. 56; and "Benton Unit—A Standout Cooperative Enterprise on Unitization of Gas-Condensate Properties," by W. L. Horner and E. G. Trostel, The Oil and Gas Journal, March 4, 1948, p. 77.

Cycling Plant

Here is a step-by-step description of the processing and equipment layout of this outstanding cooperative enterprise, and high spots of some of the different plant phases.

The views at the top of these two pages show the over-all area of new cycling plant of Barnsdall et al near Shreveport

Right: Vertical towers, from left to right, are: fat-oil still; distillate fractionator; topping tower (motor-fuel overhead); Bodcaw crude oil-distillate stripper. In lower left-hand corner appears part of the induced draft cooling tower. For complete flow diagram and products manufactured see drawing, next page



From left to right appear the lower portions of the vertical debutanizer, depropanizer, and deethanizer towers; the horizontal vessels are the reboilers for these units

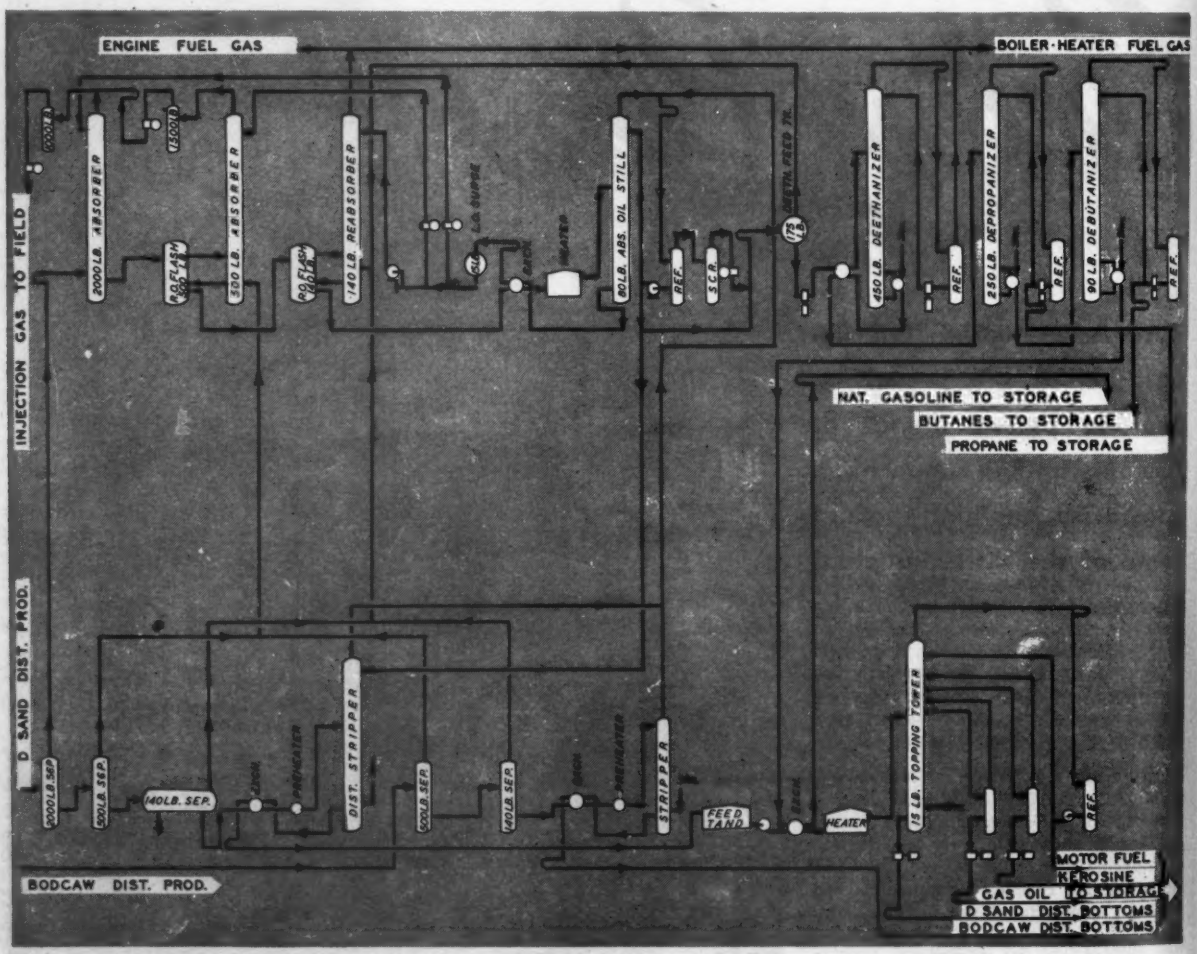
The Author

H. W. Manley was made vice president and manager of the production department of the Mid-Continent division of Barnsdall Oil Co. this year, his duties including supervision of the gas and gasoline departments as well as the engineering and production departments. Manley is a "20-year man" with Barnsdall, as he began working for the company first in 1928 as a roustabout in Seminole field, Oklahoma, during a summer school vacation. Upon graduation from Oklahoma A. & M. College, where he received a degree in mechanical and petroleum engineering, he joined the company's engineering department in 1929, working subsequently on production, pipeline, and gas-gasoline-department projects. In 1935 he was appointed assistant chief production engineer for the Mid-Continent division, and in 1939 succeeded A. J. Schlosser as general superintendent of the gas-gasoline department.

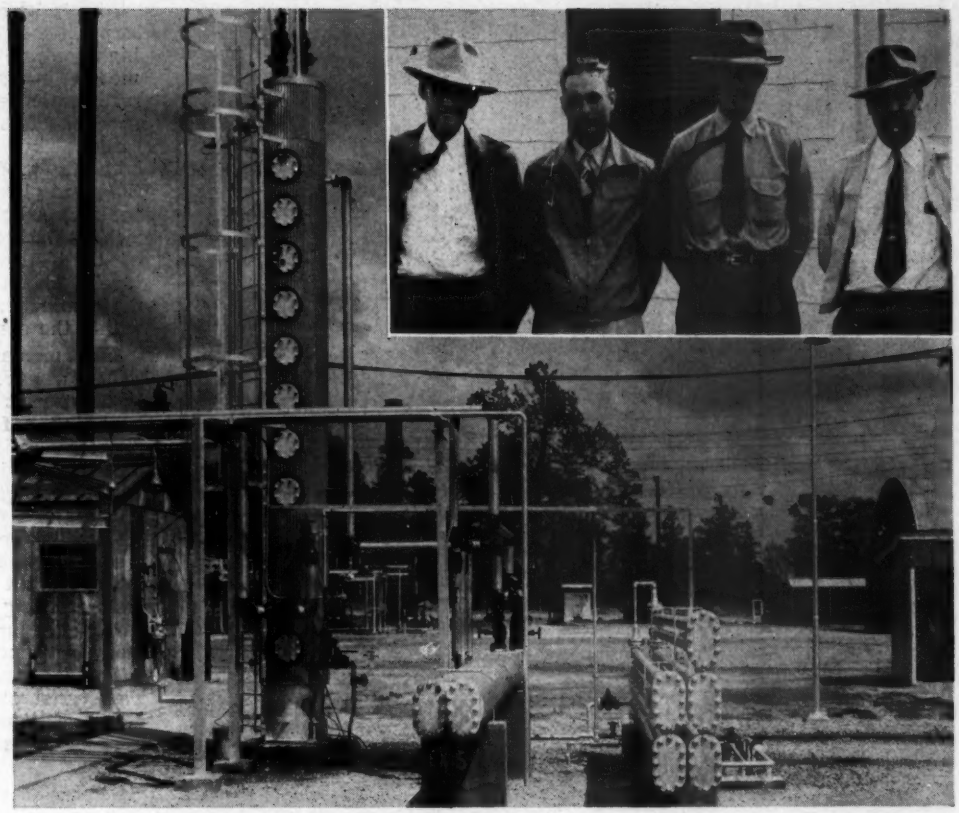
servations at the minimum of expense.

Corrosion prevention.—Tests of the raw gas to be fed to the plant showed an iron content of approximately 150 p.p.m. (this is the concentration value in the produced water, which amounts to 1 to 2 bbl. per million cubic feet of gas). To prevent internal corrosion of the high-pressure pipe line and other project equipment, corrosion inhibitor solution is injected into the high-pressure gas stream at points near each well head (see photo and cutline at top of page 5).

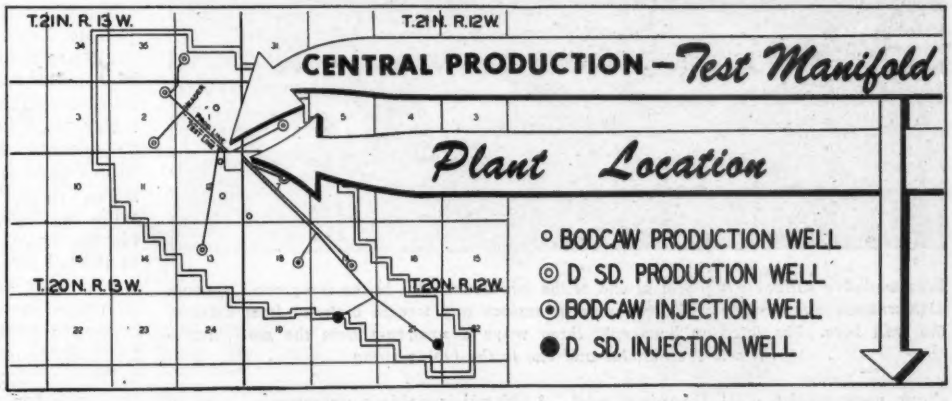
At present four different inhibitor solutions are being tested. The chemical treatments appear very satisfactory so far, as tubing caliper tests

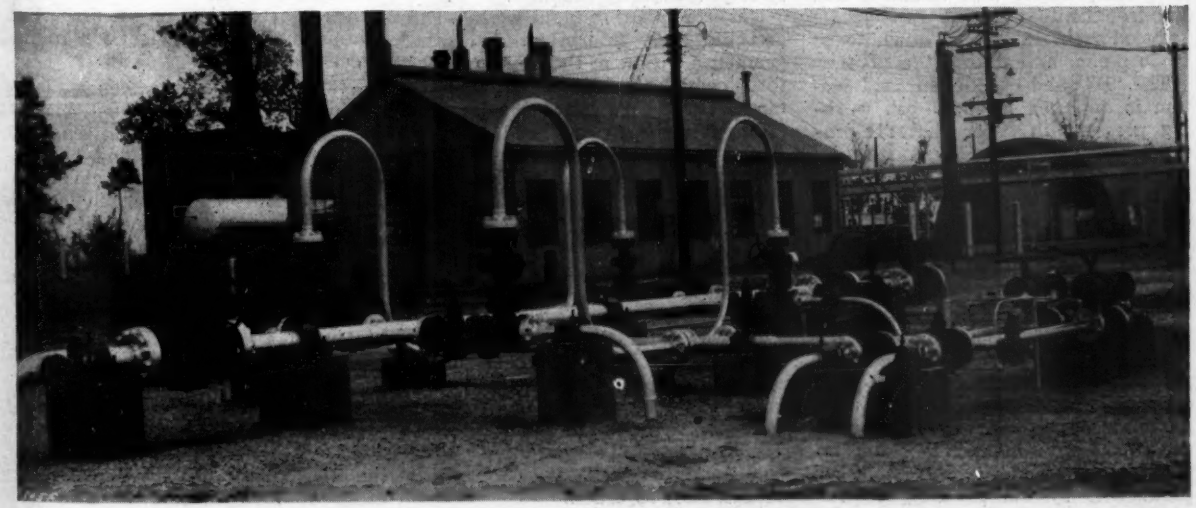


Right: Closeup of Bodcaw crude oil-distillate stripper. Aluminum protective sheeting on vessels provide permanent weatherproofing and eliminate periodic repainting. Inset: Benton Unit supervisory personnel. Left to right: L. M. Ford, plant superintendent; Bob Chesney, assistant project superintendent; O. C. Dillon, manufacturing department, Barnsdall, Tulsa; E. J. Mills, project superintendent



Map shows use of individual incoming lines from producing wells to plant. Any well may be tested under full-scale test separator conditions at the plant site without interrupting production from other wells. Below is close-up of the central manifold in plant yard which accommodates these incoming high-pressure gas lines. Here also is located one master valve which can shut in production from the entire field





Typical casing-head installation and meter house for one of the high-pressure "D" sand gas-distillate producing wells. Gas measurement is made via a vertical meter run, with orifice plate and meter protected by the house. Also inside is an electric-driven plunger pump feeding corrosion inhibitor solution down the casing of the well for corrosion prevention of the tubing-production string

Representative surface equipment at one of the injection wells. In the foreground appears high-pressure gas strainer which prevents at surface any foreign material from entering the well bore. The injection lines split three ways downstream from the meter run—two to the annulus and one to the tubing string

show very slight wall thinning, and the iron content in the raw gas is reduced from 150 p.p.m. down to 10 to 30 p.p.m. as entering the plant.

The "D" sand production field system is designed for 3,000-psi. working pressure in order that all production wells in the field may be shut in from the master inlet valve at the plant site in the event of an emergency shutdown at the plant. Production rates of 8,000 to 15,000 M.c.f. per day from "D" sand wells are practiced while delivering gas at the plant site for the primary absorption level of 2,000 psi.

Special well-completion procedures permitted the maximum well-head delivery pressure and consequent minimum retrograde condensation at the surface of the well bore on the production wells. The Bodcaw sand production system is designed for 1,000-psi. working pressure.

Gas from plant to input wells.—The accurate early interpretation of the geometric outline of the Benton structure combined with potentiometric model studies permitted the location of input wells for an "end to end" sweep pattern. The input wells are approximately 4½ miles on the southeast extremity of the field from the production wells in the northwest part of the field.

The gas-injection system, consisting of approximately 3½ miles of 6⅝-in. o.d. line, delivers gas to the two input wells for the "D" sand. Gas injection into these "D" sand input wells is made at or below the gas-water contact point. Each of these input "D" sand wells is capable of receiving 45,000 M.c.f. per day at 3,900 psi. One input well is used for the Bodcaw sand injection.

Absorption pressures.—Three absorption-pressure levels are used: the high-pressure at 2,000 psi., an intermediate pressure of 500 psi., and a reabsorption pressure of 140 psi. Inspection of the accompanying hydrocarbon flow chart will show that both the produced streams entering the plant plus each of the vents from the reduced pressure separators and rich-oil flash tanks are treated at one of these three absorption pressure levels. This arrangement allows for the elimination of all recycle streams within the absorption circuit.

Instrumentation.—Recording flow meters are provided on approximately 50 streams within the plant area. With but a few exceptions, Daniels "Senior" orifice fittings are used in connection with these flow meters. All recording flow, pressure, and temperature controllers are of the pneumatic type and the temperature controllers are mercury actuated.

The control instruments, plus several recording temperature and pressure gages, are mounted on a common instrument panel installed at one end of the process pump house. This panel also includes a 12-point electrical temperature recorder and a 12-point electrical temperature indicator.

Safety.—Emergency alarm and shutdown equipment are provided wherever such equipment appears advisable. Each of the three compressor suction scrubbers is equipped with a high-level alarm float and a high-level compressor shutdown float. The latter float is in each case installed to operate as a last resort before liquid flow into the compressor suctions. The boiler feed tank is equipped with a low-water-level alarm and alarms have been installed on each of the oil streams to the fired heaters so as to give notice of a material decrease in flow to these units. A system of yellow, blue, and red lights is adjacent to such services requiring safety shutdown equipment, whereby the operator can observe any emergency danger points on the respective equipment from any location in the process area.

Provisions have also been made to shutdown the complete plant, including all internal-combusion engines, the fires to the boilers and heaters, and the incoming gas streams with the single throw of a switch located in two different strategic points within the plant yard.

The high-pressure "D" sand gas, after entering the plant, flows directly to the 2,000-psi. distillate separator. This separator is a 48-in. i.d. vertical vessel of multilayer construction and is equipped with a gas-scrubbing element and water draw-off facilities. The distillate from the 2,000-psi. separator is expanded into the intermediate-stage separator operating at 500 psi. and is then ex-

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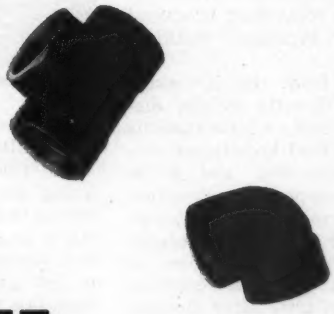

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Above, left: Interior of compressor room showing the bank of five 600-hp. units

Above, right: Electrically driven centrifugal pumps which circulate jacket cooling water for the entire plant. For ease of attendance and maintenance, these are located in the compressor building

Right: Interior of the processing unit pump room with central control board appearing at far end. Note use of protective aluminum sheeting over all pipe insulation

panded into the low-stage separator operating at 140 psi. This low-stage separator is a horizontal tank of adequate size and properly provided so as to remove the remaining produced water from the incoming distillate stream.

The distillate from the low-stage separator flows directly to the distillate stripping unit, which consists primarily of a feed-to-bottoms exchanger, feed preheater, and a 16-plate distillate stripper. The distillate is totally depropanized in this stripper and in so doing a considerable portion of the butanes and some of the pentanes plus are also removed. The stripped distillate, after flowing back through the feed exchanger, is cooled and passes on to a 3,000-bbl. topping-tower feed tank.

The distillate is continuously pumped from the topping-tower feed tank to the topping unit, which consists primarily of feed exchangers, fired feed heater, 21-plate topping tower, 5-plate kerosine stripper and a 5-plate gas-oil stripper. A 375°± end point overhead is taken from the topping tower as motor-fuel stock and specification kerosine and gas-oil cuts are taken from side streams. The topping-tower bottoms, which consists largely of the waxy ends of the distillate, is commingled and stored with the produced crude oil.

The feed heater used on the topping unit is of horizontal tube construction and contains both radiant and convectional heating sections. It is fired through the furnace floor with multiple gas burners.

The Bodcaw production, after entering the plant, flows directly to a 500-psi. separator. The crude oil-distillate from this separator passes on to a low-pressure separator operating at 140 psi. From this low-pressure separator the crude oil-distillate flows on to the crude stripping unit, which consists primarily of the feed exchangers, feed preheater, and an eight-plate crude stripper. Here the crude oil-distillate is totally depropanized and in so doing its vapor pressure has been sufficiently reduced to greatly minimize the storage and shipping losses. From the stripper the crude oil passes back through the feed exchanger and on to storage.

The 2,000-psi. gas, after leaving the distillate separator, is cooled by passing through atmospheric cooling sections located in the cooling tower and from there it flows on to the 2,000-psi. absorber. This absorber is 54-in. i.d. and contains 20 bubble-cap plates spaced at 24-in. centers. It is of multilayer construction. The residue gas from the high-pressure absorber passes through a 42-in. i.d. vertical suction scrubber and on to the suction of the injection compressors where it is boosted to the 3,900-psi. injection pressure.

The rich oil from the high-pressure absorber is expanded to the 500-psi. rich-oil flash tank and the flashed vapors from this tank join with the gas streams from the 500-lb distillate separator and the 500-lb. Bodcaw separator, and flow on to the intermediate pressure absorber. This absorber is 42-in. i.d. and contains 20 bubble-cap plates. The residue gas from this absorber is boosted to the suction of the injection compressors so as to be injected back into the producing formations with the high-pressure gas.

The rich oil from the 500-lb. absorber and from the 500-lb. flash tank is expanded to the low-pressure flash tank operating at 140 psi. and the flashed vapors from this tank join with the gas streams from the low-pressure distillate separator and the low-pressure Bodcaw separator and flow on to the reabsorber operating at a pressure of about 140 psi. The reabsorber is 36-in. i.d. and contains 20 bubble-cap plates. The residue gas

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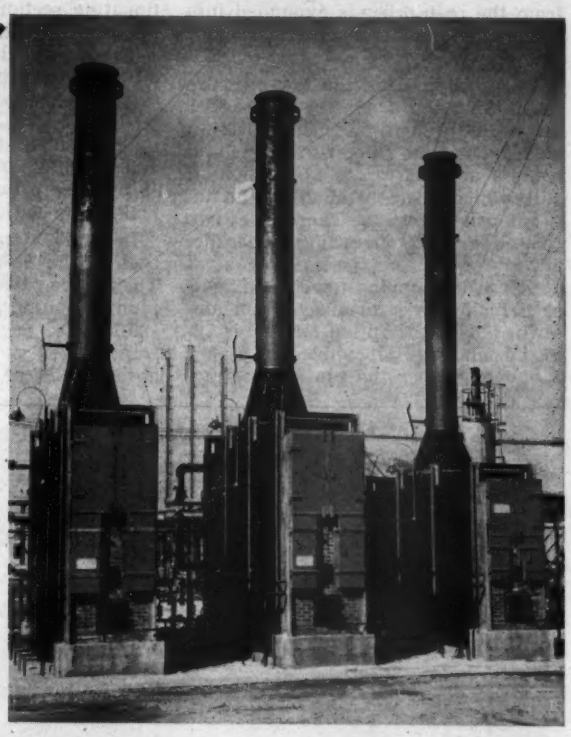

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from the reabsorber is expanded into the fuel system to be used as plant fuel.

The rich oil from the low-pressure flash tank and from the reabsorber flows on through the main oil-to-oil exchangers, the direct-fired rich-oil heaters and on to the absorption-oil still, which operates at approximately 80-psi. pressure. There are two rich-oil heaters operating in parallel and these are of the same general design as the topping-tower feed heater which has previously been described. The absorption oil still is 72-in. i.d. and has 20 bubble-cap plates, 2 of which near the top of the fractionating section have been provided for dehydration.

The lean oil leaving the absorption oil still flows back through the oil-to-oil exchangers, the oil cooler, and on to the lear-oil surge tank. This tank is 7 ft. in diameter by 24 ft. long and operates at a pressure of about 15 psi. The pressure is maintained by making up with residue gas.

Lean-oil pumps are provided for each of the three absorption systems. There are two horizontal duplex plunger pumps, each driven by a 185-hp. gas engine to boost lean oil from the surge tank to the 2,000-lb. absorber. These pumps have a maximum capacity of about 120 g.p.m. each and under normal conditions both are in operation. There are two motor-driven horizontal duplex piston pumps provided to supply lean oil to the intermediate pressure absorber and two motor-driven centrifugal pumps provided to supply lean oil to the reabsorber. Only one of the two pumps installed for each of these latter two oil systems is normally in operation. The other pump in each case is a complete standby.

The entire absorption-oil system, as described above, is quite simple inasmuch as the oil flows from beginning to end by its own pressure and no rich oil or intermediate lean-oil pumps are required. The flow has also been simplified by the fact that no vents within the rich-oil system are recycled. And, in order to maintain the greatest amount of propane and butanes in solution in the rich-oil stream with the least amount of oil circulation, the reabsorption and still pressures have been maintained at a relatively high level.

The lean absorption oil used in the system is made up from a blend of the kerosine and gas-oil products produced in the plant. This blend results in an absorption oil with an A.P.I. gravity of 41° to 42° and a molecular weight of about 200. The initial boiling point of the lean oil is maintained at approximately 440° F. In so doing the absorption-oil loss to the high-pressure residue gas is negligible. A continuous drawoff of used oil from the system and a continuous makeup with new oil is employed to keep the absorption oil in first-class condition free from impurities and heavy waxy hydrocarbons.

A common condenser setup and reflux accumulator are used for the combined overheads from the absorption-oil still, the distillate stripper, and the crude-oil stripper. These three units are, therefore, balanced on the same operating pressure of about 80 psi., which is controlled by the vent from the reflux accumulator.

The absorption-oil still and the distillate stripper are both refluxed for control of overhead end point, whereas the crude stripper is not refluxed. The total net overhead from these three distillation units, that is, the vent from the reflux accumulator plus the excess liquid from said accumulator are recombined at a pressure of 175 psi. and then cooled so as to remove the heat of vapor compression and the heat of solution from this stream. After cooling, this combination vapor-liquid stream flows on to the deethanizer feed tank which is a horizontal vessel 5½ ft. in diameter and 28 ft. long.

The vent from the deethanizer feed tank is recycled back to the reabsorber. This is the only recycle gas stream within the process and, since

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No. 5 Antioxidant No. 5 is a solution containing 50% Normal-butyl-para-aminophenol, 30% Anhydrous iso-propanol, and 20% Anhydrous methanol.

PROPERTIES

Specific Gravity at 60°/60° F	0.91
Pounds per Gallon at 60° F	7.57
Flash Point (Tag C.C.) ° F	60.
Viscosity at 100° F., S.U.S.	41
Solidification Temperature, ° F	—20

No. 6 Antioxidant No. 6 is a solution containing 50% Iso-butyl-para-aminophenol, 30% Anhydrous iso-propanol, and 20% Anhydrous methanol.

PROPERTIES

Specific Gravity at 60°/60° F.	0.91
Pounds per Gallon at 60° F	7.57
Flash Point (Tag C.C.) ° F	60
Viscosity at 100° F., S.U.S.	41
Solidification Temperature, ° F	0

No. 22 Antioxidant No. 22 is a commercial grade of N:N'-disecondary butyl-para-phenylene-diamine containing no solvents.

PROPERTIES

Specific Gravity at 60°/60° F	0.94
Pounds per Gallon at 60° F	7.67
Flash Point (C.O.C.) ° F	290
Viscosity at 100° F., S.U.S.	64
Solubility in Water at 80° F., Weight %	<0.05
Solubility in Gasoline at 80° F	In all proportions

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it has been liberated from the total net still and stripper overheads at an equilibrium pressure and temperature of 175 psig. and about 90° F., respectively, only a relatively small amount of propane and heavier are present for reabsorption. The liquid is pumped from the deethanizer feed tank at a constant flow rate through feed exchangers to the deethanizer column, which operates at a pressure of 450 psi. This is a 42-in. i.d. column and contains 27 bubble-cap plates.

The overhead from the deethanizer which consists largely of methane, ethane, and some propane is condensed and cooled by atmospheric sections installed in the cooling tower. The total condensate obtained is pumped back to the deethanizer as reflux. This type of reflux control allows for a minimum top temperature of the tower at all times, thereby reducing the over-all propane content of the overhead vapors and the resulting propane loss. The vent vapors from the reflux accumulator are expanded into the plant fuel system to be used for boiler and heater fuel. At the 450-psi. operating pressure of the deethanizer unit the reboiler temperature is about 290° F.

The bottoms from the deethanizer reboiler flow back through the feed exchanger and on as feed to the depropanizer. This unit operates at a pressure of approximately 250 psi. and at this pressure the reboiler temperature is about 300° F. The column is 42-in. i.d. and contains 36 bubble-cap plates. The bottoms from the depropanizer reboiler flow directly as feed to the debutanizer, where the natural-gasoline stream is debutanized to whatever vapor pressure is required for blending with the motor fuel. This is a 48-in. i.d. column containing 36 bubble-cap plates. The normal operating pressure is about 90 psi. and at this pressure the reboiler temperature is approximately 285° F.

Storage and Blending Equipment

Twelve cylindrical horizontal pressure storage tanks have been provided for storing the propane, mixed butanes, and natural-gasoline products. There are three 9-ft. diameter by 60-ft. long by 250-psi. working-pressure propane storage tanks, seven 11-ft. diameter by 60-ft. long by 60-psi. working-pressure butane storage tanks, and two natural-gasoline storage tanks of the same size as the butane tanks but designed for 40-psi. working pressure.

Two 3,000-bbl. floating-roof tanks have been installed as rundown tanks for the motor-fuel stock produced as overhead from the topping tower. These tanks are also used for blending the natural gasoline with the motor-fuel stock and for ethyl blending of the composite so as to produce a finished leaded motor fuel. Turbine-driven centrifugal pumps are used for transfer and for circulation of the contents of these two blending tanks.

In addition, two 25,000-bbl. floating-roof tanks have been installed for motor-fuel storage. These tanks are each equipped with a turbine-driven mechanical mixer. The kerosine, gas-oil, and crude-oil products are stored in numerous atmospheric cone-roofed tanks ranging in size from 250 to 1,500 bbl. each.

Examination of the accompanying flow chart shows that three compressor services have been installed; first, the compression of the high-pressure residue gas to the injection system, second, the compression of the intermediate-pressure residue gas to the suction of the injection units and, third, the compression of the absorption-oil still reflux accumulator vent vapors to the deethanizer feed tank. These three compression services are taken care of by five 600-hp. angle-type compressors, each equipped with four compressor cylinders. There are two injection cylinders (the first service) on each of two compressors and three injection cylinders on each of the other three compressors. There is one intermediate pressure cylinder (the second service) on each of the five compressors and one low-pressure cylinder (the third service) on

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each of the two compressors having only two injection cylinders. This accounts for the total of 20 compressor cylinders.

Large bottles designed to serve as pulsation dampeners have been installed on the suction and discharge of all compressor cylinders. These bottles were fabricated from standard pipe ranging in size and weight from 16-in. o.d. Schedule 40, Grade "A" for the low-pressure service up to 10-in. XX, Grade "B" for the injection service. This arrangement has greatly minimized the effect of compressor pulsation on both the suction and discharge piping to and from the compressors. It has also allowed for more accurate meter measurement of the injection gas both in the plant and in the field.

Three motor-driven centrifugal pumps circulate the jacket water through a closed system to the compressors, as well as to the generator engines and the lean-oil pumping engines. Condensed steam is used as makeup to the jacket water system.

Three 200-hp. water-tube boilers operating at a pressure of about 240 psi. have been provided for steam generation. The normal high-pressure-steam demand is approximately 25,000 lb. per hour; however, with all shipping pumps in service this demand runs well over 30,000 lb. per hour.

Simplex steam reciprocating pumps are used throughout for the process pumping services and these pumps exhaust into a 100-lb. steam system. This exhaust steam is used for stripping in the absorption-oil still, the distillate stripper, the crude stripper, the topping tower, and the kerosine and gas-oil strippers. All exhaust steam not used for stripping purposes is condensed by use of an induced-draft air cooler and the condensate therefrom is returned to the boiler plant.

A 4-ft. diameter vertical vessel equipped with a number of baffle plates has been provided for the boiler-feed-water heater. This heater operates at a pressure of about 30 psi. and a small amount of high-pressure steam is introduced below the baffle plates for purpose of heating the feed water to boiling temperature and for purpose of deaeration. A steam vent of approximately 400 lb. per hour is continuously withdrawn from the top of the feed-water heater so as to insure the complete elimination of all oxygen and carbon dioxide from the boiler system.

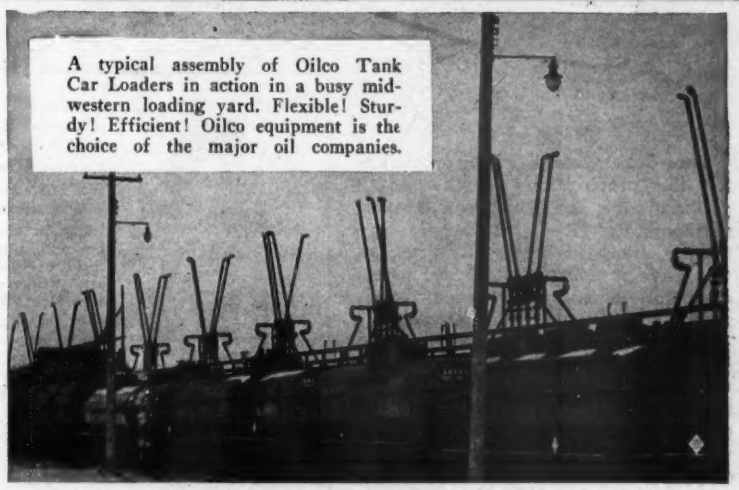
The generator plant is made up of three 250-kw. generators, each driven by a four-cycle gas engine. Two generators are sufficient for carrying the normal load, leaving one unit as a complete standby. The electric load is made up largely from the three jacket-water pumps, four cooling-tower circulating water pumps, six cooling-tower fans, two intermediate-pressure lean-oil pumps, two low-pressure lean-oil pumps, two starting air compressors, two utility water pumps, three condensate water pumps, and the plant lights. The generators are housed in a steel-frame corrugated-iron building 34 ft. wide by 14 ft. high by 70 ft. long.

The contract covering the design and construction of the Benton cycling plant was let jointly to the F. S. West Co. of Houston, and to The Lummus Co. of New York City. The former company did all the engineering work in connection with the design of the plant and the latter performed the actual construction job. The engineering work started in September 1946 and the plant was put in operation approximately 17 months thereafter.

BOOKS

PRINCIPLES AND METHODS OF TELEMETERING. By Perry A. Borden and Gustave M. Thynell. Reinhold Publishing Corp., 330 West 42nd Street, New York. 230 pp. $4.50.

Originally, the authors had the idea of gleaning data from manufacturers' catalogs, but this idea was early cast aside and as far as possible they established direct contact with responsible technical representatives of outstanding manufacturers, distributors, and users of such equipment—thus obtaining first-hand information for the book.



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The Preparation of Drilling Muds For Laboratory Investigations

SUMMARY

The development of a procedure for the preparation of water base drilling muds for laboratory investigations is described. For the preparation of standard muds dispersion of the clays is accomplished by means of a colloid mill. Subsequent aging of the suspensions yields stable systems which are not appreciably altered by any of the physical operations encountered in routine laboratory tests. Muds with widely different properties can be formulated by varying the proportion and types of clays used in the preparation.

INTRODUCTION

IN laboratory investigations of the problems which are concerned with aqueous drilling muds, it has been found advantageous to employ muds prepared in the laboratory. Some of the advantages of such systems over muds from the field are:

1. The composition of the system is known, and the experimental results can be more readily interpreted.
2. The system may be reproduced.
3. Storage problems are minimized since the ingredients may be stored as the dry powders and mixed as desired.
4. The systems can be varied as desired by use of different amounts and ratios of clay, weighting agents, electrolytes, or other materials.

This report reviews the development of the procedure used to prepare muds in the laboratory and presents a few systems which have been useful for experimental purposes. The physical properties of these muds are not necessarily ideal from a field viewpoint. Their use is justified by the fact that they are used to study the effect of various treating agents or contaminants. The physical properties of the treated or contaminated system may then be adjusted by suitable chemical treatment to any desired values.

THE AUTHORS

P. G. CARPENTER

Paul G. Carpenter is chief of the production research section of the research department of Phillips Petroleum Co. He joined Phillips February 1, 1947. He received his undergraduate training at Willamette University, graduating with the B.A. degree in chemistry in 1935. He obtained his M.S. degree in chemistry at Oregon State in 1937 and in 1941 the Ph.D. in chemistry at University of Wisconsin. Previous to his employment with Phillips he was graduate assistant at the University of Wisconsin, assistant professor at Willamette University, and a research chemist and supervisor at Hercules Powder Co.

H. B. FISHER

H. B. Fisher is with Phillips as supervisor of research problems connected with production chemistry. He is a member of A.C.S. He joined Phillips in November 1946. He received his B.S. degree in chemistry at Antioch College in 1932. In 1936 he obtained his Ph.D. in physical chemistry at University of Illinois. Before joining Phillips he was employed by Darco Corp. and by Aluminum Co. of America.

W. E. BERGMAN

William E. Bergman received his M.S. degree in chemistry at Massachusetts State College in 1940. Before joining the research staff of Phillips in September 1945 he was employed by University of Missouri and Tennessee Valley Authority.

Since his employment with Phillips, Bergman has been engaged in research problems connected with production chemistry.

by W. E. Bergman, H. B. Fisher, and P. G. Carpenter

EXPERIMENTAL

A. Materials used in preparation of Muds.—The materials which have been used in the synthesis of the aqueous muds herein described are readily available products. While they represent materials used or found in field muds, they do not include the gamut of such materials. The products are briefly described below. Chemical and X-ray data are presented in Tables 1 and 2. In Table 1, concentrations of certain of the metallic constituents were estimated by emission spectrographic analysis.

1. Bentonites.—These clays are found in many native deposits and are characterized by having montmorillonite as their principal mineral constituent. Two broad classifications have been applied to bentonites. The Wyoming bentonite readily takes up water and disperses easily in water. The deposits frequently contain 85 per cent of montmorillonite which has sodium and calcium as the major exchangeable cations. X-ray analysis of the laboratory sample gave 90 per cent of montmorillonite and 5 per cent quartz. The so-called "nonswelling" type of bentonite has calcium as the principal exchangeable cation. This bentonite disperses with difficulty in water, although once dispersed it forms fairly stable suspensions. The nonswelling bentonites reported in Tables 1 and 2, as exemplified by Rogers Lake clay (California), Stephens clay (West Virginia),

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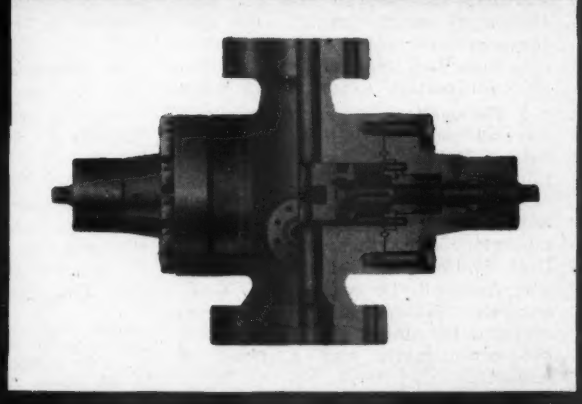

TABLE 1—CHEMICAL ANALYSES OF MATERIALS USED IN PREPARATION OF MUDS
(Analyses based on materials dried at 105° C.)

	Bentonites						Ezmix		Barium
	Wyoming	Rogers Lake	Stephens	Mc-Kracken	Kaolin	Halloysite	Batch 1	Batch 2	sulfate
Loss on ignition†	4.8	11.30	7.38	6.34	13.78	16.5	4.61	4.66	....
SiO_2	61.8	44.5	52.70	63.5	40.40	38.6	37.07	31.7	5.06
Fe_2O_3	4.26	6.40	5.72	3.89	0.82	....	1.82	.89	5.86
Al_2O_3	22.0	12.40	20.92	18.35	41.55	44.1	10.8	11.38	0.44
CaO	1.32	7.98	2.11	.51	0.23	0.18	16.17	16.83	....
MgO	2.46	4.98	1.66	1.61	0.18	0.18	8.17	13.54	0.49
K_2O	*.5	*1.0	*2.5	*2.0	0.89	*0.0	*1.0	*0.5	....
Na_2O	*1.0	*1.0	*0.5	*0.2	0.03	*0.0	*1.0	*0.5	....
TiO_2	*0.5	*1.0	*1.0	*1.0	2.30	*0.0	*0.2	*0.2	....
P_2O_5	....	....	....	....	....	0.17	....	....	....
MnO_2	....	....	1.33	....	....	....	....	....	....
SrO	*0.0	*tr.	....	*0.5	*0.0	*0.0	*1.0	*1.0	....
BaO	*0.0	*tr.	.08	....	*0.0	*0.0	.02	0.0	....
Sulfate	1.00	....	.37	0.0	....	....	.06	0.05	....
Chloride	0.27	....	....	....	....	....	....	....	....
Carbon dioxide	.37	6.11	2.61	.55	....	0.23	17.20	22.33	....
Bicarbonate	0.92	....	....	....	....	....	....	....	....
$BaSO_4$	....	....	....	....	....	....	....	....	88.82
Total of above	98.83	93.67	94.98	94.00	99.98	99.96	95.82	101.38	100.70
Moisture (105° C.)	9.85	4.92	9.78	4.80	0.67	3.30	6.37	7.56	0.13

*Estimated metallic concentration by emission spectrographic analysis. †Loss in weight between 105° and 1,000° C. minus analyzed CO_2 content.

TABLE 2—X-RAY ANALYSIS† OF MATERIALS USED IN PREPARATION OF MUDS

	Bentonites						Ezmix	
Constituent—	Wyoming	Rogers Lake	Stephens	McKracken	Kaolin	Halloysite	Batch 1	Batch 2
Montmorillonite	90	30	50-60	20-50	...	...	...	...
Kaolinite	...	...	...	...	100	...	...	...
Halloysite	...	...	...	...	...	100	...	...
Nontronite	...	...	...	...	...	...	10	10
Quartz	5	5	30-40	50-70	...	P*	2	2
Dolomite	...	...	...	...	...	...	30	50-60
Calcite	...	40	...	...	...	...	10	5
Anhydrite	...	...	...	...	...	...	3	3
$Na_2CO_3 \cdot CaCO_3 \cdot 5H_2O$	...	...	...	...	...	...	3	3
Feldspar	...	...	...	...	...	P*	...	...

*Present in small amounts according to petrographic analysis. †Comparisons made against purified samples of clay minerals. When percentages do not total 100 per cent, the difference may be taken as amorphous material.

and McKracken clay (Kansas), contain large amounts of impurities.

2. Kaolin.—The laboratory sample used in these tests was found to be essentially the pure mineral. This clay upon dispersion in water yields particles which are mainly one micron or larger in size. Hence, dilute suspensions of kaolin settle rapidly. While this clay is not used in the preparation of field muds, incorporation of this mineral in laboratory muds simulates inclusion of one of the main mineral groups—the kaolinite group—which would be introduced into some field muds during drilling. Further, its use, in contrast with bentonite, readily permits the synthesis of muds with a high percentage of solids. This type of mud is desirable for certain experimental work.

3. Halloysite.—The structure of this mineral has not been definitely established[1]. It has the chemical composition of a hydrated kaolin, but removal of water does not give a product with the structure of kaolin. The laboratory sample was obtained from Utah, and only the mineral halloysite was found to be present by X-ray analysis. Petrographic examination revealed the presence of less than 3 per cent quartz and a trace of feldspar.

4. Ezmix.—This material is marketed as a West Texas clay which in suspension is resistant to the effect of brine. Batch No. 1 of this clay contained 30 per cent dolomite, 10 per cent nontronite, 10 per cent calcite, 3 per cent calcium sulfate, 3 per cent sodium and calcium carbonates, and 2 per cent quartz. Batch No. 2 contained a higher concentration of dolomite. Use of this clay in muds gives what may be considered a heterogeneous system saturated with anhydrite.

5. Barium sulfate.—A commercial product sold extensively as a weighting agent for field work has been used.

6. Barium carbonate.—A commercial product sold for field use as a reagent to combat sulfate contamination.

B. Physical tests.—The physical tests for the mud systems are those described in the A.P.I. Code 29, "Standard Procedure for Testing Drilling Fluids," second edition, July 1942. These tests are outlined below.

1. Viscosity and gel-strength determination.—The viscosities and gel strengths of the suspensions were measured with a Stormer viscosimeter.* The load in grams required to give 600 r.p.m. of the rotor was converted to viscosity, reported in centipoises, by means of a calibration curve obtained with standardized glycerol solutions. The initial gel strength is the minimum load in grams required to produce a movement of one-quarter revolution of the spindle immediately after vigorous agitation of the suspension. The 10-minute gel strength is the minimum weight necessary to cause sustained rotation after the suspension has remained quiescent for that period of time.

2. Water-loss and filter cake thickness.—The water-loss values, expressed as ml/30 min., were determined at room temperature (about 25 C) using the standard Baroid press at a gage pressure of 100 lb./sq. in. The filter cake was removed from the cylinder of the press and washed to remove excess, loose mud. The cake thickness was measured and is reported in sixty-fourths of an inch. The values for the cake thickness for a given type of mud should be directly related to the water-loss.

*The Stormer viscometers as received are equipped with either a pan, weighing 15 g., or a knob, weighing 4 g., attached to the plumb line. In this laboratory the pans have been replaced by the knobs, so that a 4-g. weight is always on the line. The specifications in A.P.I. Code 29 do not indicate if this is considered a "zero weight" on the line. If this is not the case the gel strengths above 4 g. in value are two low by this value. Zero gel strengths herein reported would indicate the range of 0-4 g. No error would be introduced in the viscosities. The "zero" value for gel strengths should be accurately defined.

The values are not sufficiently precise to be of fundamental importance and are generally disregarded.

3. pH Determination.—All pH determinations were performed with a Beckman meter. The behavior of the glass electrodes was periodically checked with buffer solutions. With a given mud the determinations were generally reproducible to ± 0.05 pH units.

It should be mentioned that before performing these pyhsical tests the muds should be stirred vigorously and the physical properties, especially viscosity and gel strength, determined immediately and in the order named, if reproducible results are to be obtained. The reason for this is that for thixotropic substances the apparent viscosity coefficient reaches a constant minimum value only after several minutes of shearing. A few tests with bentonite suspensions indicated that approximately 5 minutes of vigorous stirring was sufficient. However, a 30-minute period is used for all tests in the laboratory.

C. Nomenclature.—A nomenclature system has been adopted to simplify the description of the muds. The abbreviations chosen for the clays are as follows: Wyoming bentonite = B; Rogers Lake clay = R; Stephens clay = S; McKracken clay = Mc; kaolin = K; Halloysite = H; Ezmix = E (E for Batch No. 1, and E_2 for Batch No. 2). To describe the composition of a clay-water system, the clay symbols are followed by the weight ratio of the clays present (if more than one clay is present) and the percentage of the clay solids. Thus a mud containing 5 per cent Wyoming bentonite is labeled B (5 per cent); a mud with a total of 25 per cent by weight of kaolin and bentonite with a kaolin to bentonite weight ratio of 10:1 is labeled KB-10 (25 per cent). Muds containing weighting agents are given no additional symbol.

D. Preparation of muds.—In the preparation of laboratory muds three factors are generally considered: (1) The clays desired and their weight ratio, (2) the proportion of total clay, water and weighting agent, and (3) the preparation of a comparatively stable system. The first of these factors is empirically set, while the second is experimentally determined by establishing the properties of systems prepared with various proportions of the ingredients. The third of these factors, which is very important, is ascertained by measuring the physical properties of the muds over an extended period.

In mixing muds, two techniques have been employed. In one, all the components were dispersed in the desired amount of water using high-speed stirring for 1 hour. The stirrers used were similar to the commercial fountain type with variable speed achieved by use of a variac. For the second, the clays (without weighting agents because of their abrasiveness) were dispersed in an Eppenbach QV-6 colloid mill. The muds were milled first at No. 72 coarse setting (0.0166 in.) and subsequently at No. 24 fine setting (0.005 in.). These settings were arbitrarily chosen. After dispersing the clays, weight agents, if any, were dispersed by means of a high-speed stirrer or by shaking.

RESULTS AND DISCUSSION

A. Composition of mud systems.—To establish the proportion and amounts of clays and water required to obtain a mud system with a workable viscosity, viscosity-clay concentration data were determined. Typical data are shown in Table 3. The indicated muds were dispersed in water with an Eppenbach colloid mill, the

TABLE 3—VISCOSITY-CONCENTRATION DATA ON VARIOUS CLAY-WATER SYSTEMS PREPARED IN THE EPPENBACH QV-6 COLLOID MILL AND THE CHANGE IN VISCOSITY UPON AGING THE SYSTEMS

Clay-water system:	Weight per cent clay	Stormer viscosity at 600 r.p.m. cps. Immediate	24 hrs.	48-72 hr.	Mud weight lb./gal.	Yield value
B	7	100	...	...	...	...
	6	60	...	...	...	...
	5	22	...	...	...	...
	4	7.5	...	...	...	...
	3	1.9	...	...	...	125
E (Batch 1)	20.1	49.5	48	...	9.6	...
	15	17.5	17.5	...	9.2	...
	12	6	6	...	9.0	...
E_2 (Batch 2)	20	101	...	97.5	9.6	...
	15	25.5	...	33.5	9.2	...
	12	13	...	15	9.0	...
EB-10	20	67	...	63.5	...	...
	15	20	...	23.5	...	...
	12	8	...	8.5	...	...
E_2B-10	15	41.5	40	...	...	...
	12	20.5	19.5	...	...	...
	10	9.5	9.5	...	...	...
K	5	settles out	...	...	...	...
KB-10	30	78	...	...	...	...
	28	45	...	...	...	...
	26	27	...	...	...	...
	24	15	...	...	...	...
	22	9	...	...	...	...
	20	3.6	...	...	...	...
	17.5	2.5	...	...	...	...
	15	1.7	...	...	...	20.5
H	5	settles out	...	...	...	...
HB-5	14	100	...	...	...	...
	12	60	...	...	...	...
	10	36	...	...	...	...
	8	14.5	...	...	...	...
	6	2.5	...	...	...	70
HB-10	14	100	...	...	...	...
	12	60	...	...	...	...
	10	35.5	...	...	...	...
	8	21	...	...	...	...
	6	9.8	...	...	...	...
	5	4.7	...	...	...	...
	4	1.7	...	...	...	75
HB-20	17.5	91	...	...	...	...
	15	60	...	...	...	...
	12.5	37	...	...	...	...
	10	21	...	...	...	...
	7.5	8	...	...	...	...
	6	2.7	...	...	...	59
R	50	67.5	...	...	...	...
	45	19.5	...	...	...	...
	40	6.5	...	...	...	...
	35	3.5	...	...	...	9.7
						*10.7
RB-10	30	40	...	...	...	...
	28	22	...	...	...	...
	26	14.5	...	...	...	...
	24	8.5	...	...	...	...
	22	5	...	...	...	...
	20	3	...	...	...	18.1
S	32.8	37.5	36	...	10.6	...
	27.3	15	15	...	10.05	...
	21.9	4.5	4.5	...	9.65	17.3
SB-10	29.6	16	19.5	25.5	10.3	*18.2

*On aged clay-water system.

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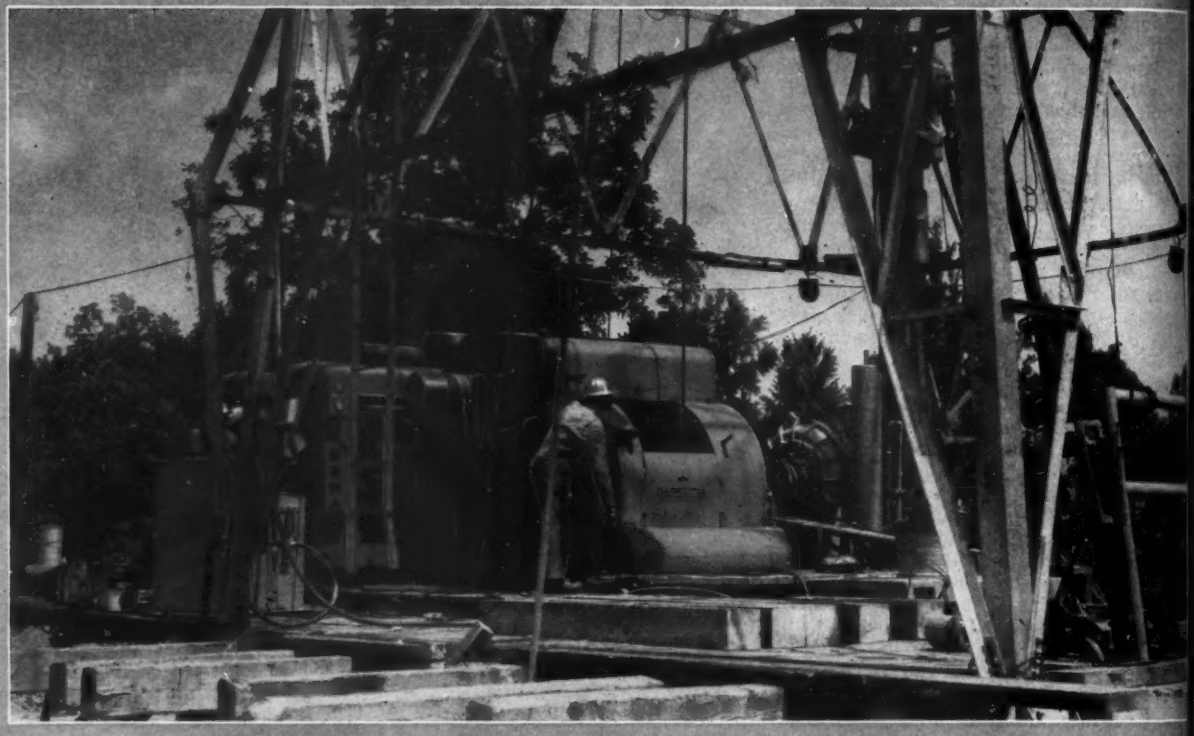

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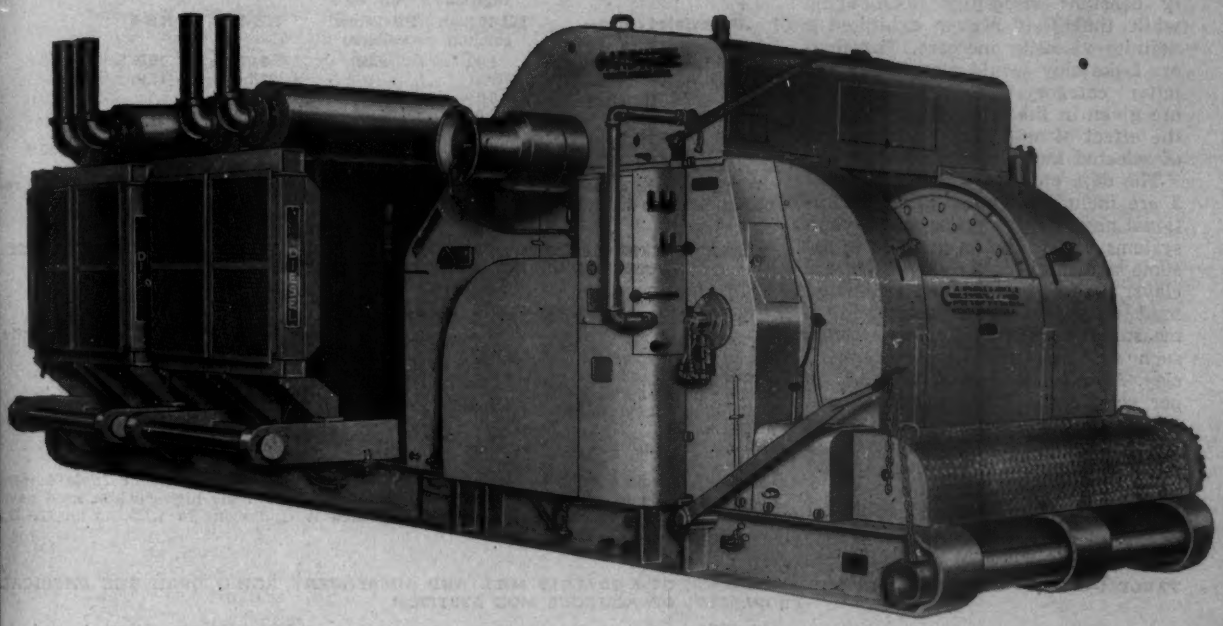

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muds being milled for 5 to 10 minutes at a gap setting of 72 and finally at a gap setting of 24 for such a period of time that the viscosity of the suspension remained essentially constant over a 10-minute milling period. Yield values, defined in this case as the number of barrels of 15-centipoise mud that can be prepared from 1 ton of clay, are included in Table 3 and show a gamut of values from 125 for the Wyoming-type bentonite (B) to 9.7 for Rogers Lake clay (R).

A limited amount of data are included in Table 3 which show the effect of aging upon the viscosities of these muds which have been milled from 0.5 to 2 hours. All muds were stirred 30 minutes on a high-speed mixer prior to the viscosity determination. The Ezmix (E), Stephens clay (S), and EB-10 systems maintain fairly constant viscosities upon aging while the SB-10 system exhibited a definite viscosity increase. The Rogers Lake clay would also fall in the latter category. Further comments are given in the following section on the effect of aging on the properties of selected mud systems.

The data on mud weights in Table 3 are included as examples of additional physical properties on the mud systems. It is common practice to assume a density of 2.5 g. per cc. for clays. Using this value, calculated mud weights are low compared to measured mud weights for systems such as those made with Stephens clay. A determined density of 2.91 g. per cc. for the Stephens clay gives calculated mud weights which agree with measured values. Mud weights were determined on a Baroid mud balance.

B. Effect of milling and aging on physical properties of muds.—As previously stated, a most important factor was to prepare systems having physical properties which could be closely reproduced and which would not change appreciably upon aging. The technique of preparing the muds was found to be important in this respect. When the clays were dispersed in water with high-speed mixers the physical properties would vary appreciably upon subsequent aging. When the colloid mill was used this effect was minimized. As a result, the colloid mill has been used almost exclusively in the preparation of muds. However, even when the mill is used changes occur; and two factors must be kept in mind: (1) the length of time the mud is milled at each gap setting, and (2) the volume of mud. The latter factor is essentially equivalent to the first since the effective shearing period in the mill is inversely proportional to the volume of mud. Typical results illustrating the effect of milling are shown in Table 4. The effect of aging the muds at room temperature subsequent to milling is also shown. For these tests, no weighting agents were present, and in one case the base mud was diluted with water (5 vol. mud to 1 vol. water) before testing.

(Continued on page 122)

TABLE 5—COMPOSITION OF SOME STOCK SUSPENSIONS OF MUD, PER CENT BY WEIGHT*

Descriptive name—	Ezmix-bentinate, high Ca	Ezmix-bentonite, low Ca	Kaolin-bentonite	Kaolin-bentonite	Bentonite, 5.7%
Abbreviated name—	EB-10 high calcium	EB-10 low calcium	KB-10	KB-5	
Bentonite	1.00	0.92	2.27	13.0	6 2
Kaolin	....	.....	22.7	17.0	....
Ezmix	10.0	9.17	....	....	....
Barium sulfate	30.0	30.0	22.0	20.0	....
Barium carbonate	....	0.92	....	....	....
Water	59.0	59.0	55.0	60.0	93.8

*These values are not corrected for moisture content of these components as reported in Table 1.

TABLE 6—REPRESENTATIVE VALUES FOR THE PHYSICAL PROPERTIES OF AQUEOUS DRILLING MUDS DEVELOPED IN THE LABORATORY

	Mud system*				
	EB-10 high calcium†	EB-10 low calcium	KB-10	KB-5	5.7% bentonite
Viscosity, cp.	14	14	20	22	15
Initial gel strength, g.	25	21	0	2	0
10-min. gel strength, g.	30	45	10	35	15
Water-loss, ml./30 min.	54	31	19	14	12.0
pH of mud	7.9	9.2	8.0	8.1	8.7
Density, lb./gal.	11.2	11.2	11.2	...	...

*For all tests 5 parts by volume of the stock suspensions reported in Table 4 were diluted with 1 part of water. †Analysis of the filtrate from the high-calcium mud gave 6,400 p.p.m. total solids, 550 p.p.m. calcium which is equivalent to 1,730 p.p.m. $CaCO_3$, and 465 p.p.m. chloride.

TABLE 4—EFFECT OF MILLING IN THE EPPENBACH GV-6 COLLOID MILL AND SUBSEQUENT AGING UPON THE PHYSICAL PROPERTIES OF AQUEOUS MUD SYSTEMS*

	Stormer viscosity at 600 r.p.m. cp.									Water-loss, ml./30 min.						
Grinding time, min. at No. 72 gap	5	5	15	5	30	5	5	5	5	5	5	15	5	30	5	5
Grinding time, min. at No. 24 gap	5	15	15	30	30	45	60	75	90	5	15	15	30	30	60	90
HB-10 (8 Per Cent)—1,000-g. Batch																
Aging time, days:																
0	6	..	9.5	..	13	16	19	..	..	...	...	...	...	...	...	...
HB-10 (8 Per Cent)—3,000-g. Batch																
0	..	..	..	..	..	8	..	..	..	...	...	...	...	...	...	...
1	..	..	..	..	..	8.5	..	..	..	...	...	...	...	...	...	...
2	..	..	..	..	..	8.5	..	..	..							
B (5 Per Cent)—5,000-g. Batch																
0	18	..	21	..	..	21	..	22	...	12.5	...	10.8	...	9.8	9.5	
1	16	..	18	..	..	18	..	22	...	11.0	...	10.8	...	10.1	9.9	
7	16	..	18	..	..	20	..	25	...	11.4	...	11.3	...	10.3	9.3	
R (40 Per Cent)—4,500-g. Batch																
0	..	..	..	..	..	6.5	..	..	...	...	...	...	...	4.2	...	
1	..	..	..	..	..	11	..	..	...	...	...	...	...	4.4	...	
6	..	..	..	..	..	15	..	..	...	...	...	...	....	6.0	...	
S (32.8 Per Cent)—2,000-g. Batch																
0	..	..	..	..	..	37	..	.	...	...	...	...	...	...	...	
3	..	..	..	..	..	36	..	..	...	...	...	...	...	...	...	
4	..	..	..	..	..	35	..	..	...	...	...	...	...	63	...	
KB-10 (25 Per Cent)†—2,500-g. Batch																
0	8	..	13	..	11	10	..	..	22	...	20	...	17	16	...	
1	12	..	..	..	..	11	..	..	20	...	...	...	16	16	...	
3	..	..	11	..	..	..	..	..	...	...	19	...	...	...	...	
7	..	..	..	9	..	9	..	..	...	...	...	...	16	16	...	
18	..	..	10	..	..	..	..	..	...	...	18	...	...	...	...	
25	10	..	..	..	..	..	..	..	19	...	...	...	...	...	...	

*No weighting agents in the muds. †Five-volume mud diluted with one-volume water before testing.

JOURNAL-Series ON Petroleum Engineering Time Savers

Chart for Use in Productivity-Index Calculations

This is the first of several useful engineering shortcuts, presenting nomographic charts and discussions prepared by Dr. John C. Calhoun, Jr., head, School of Petroleum Engineering, University of Oklahoma, Norman.

THEORY has been given in the literature to show the expected variation of productivity index as the pressure declines on a reservoir.[1,2,3] The application, made primarily to an internal gas-drive reservoir, indicates a variation determined by the pressure on the reservoir and the saturation of oil in the reservoir at any time. The quantitative expression for this change is:

$$\frac{PI}{(PI)_i} = \left(\frac{k_o/k}{\mu_o\beta}\right) \Big/ \left(\frac{k_o/k}{\mu_o\beta}\right)_i \quad (1)$$

where

(PI) = productivity index desired at any time

$(PI)_i$ = productivity index at initial conditions of the reservoir

k_o/k = relative permeability to oil

μ_o = reservoir oil viscosity, and

β = formation volume factor

The subscript "i" refers to quantities measured at initial reservoir pressure and original reservoir saturation.

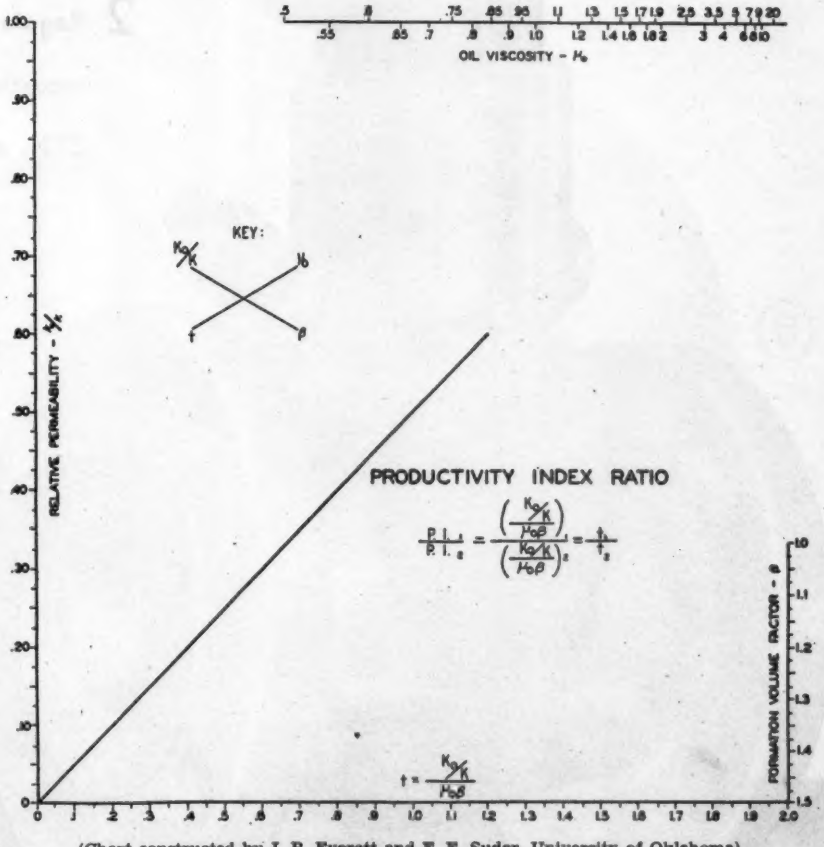
The accompanying chart has been designed to facilitate rapid calculations of the ratio $\frac{k_o/k}{\mu_o\beta}$ which is used in the above calculation, and which subsequently can be used to give the drop in productivity index.

Example: Assume that on a reservoir having 3,000 psia. initial pressure, a connate water of 15 per cent, a reservoir oil viscosity of 0.5 cp., and a formation volume factor of 1.5, an initial PI of 2.0 was measured. At a pressure of 1,500 psia. the reservoir has produced sufficiently that the oil saturation has fallen to 75 per cent, the reservoir oil viscosity is 0.8 cp., and the formation volume factor is 1.30. An estimated PI at the new time can be found by Equation 1.

The chart is used first to calculate $\left(\frac{k_o/k}{\mu_o\beta}\right)_{3000}$, k_o/k being read from an appropriate graph as 0.82 at 85 per cent oil saturation and then to calculate $\left(\frac{k_o/k}{\mu_o\beta}\right)_{1500}$, k_o/k being read from an appropriate graph as 0.65 at 75 per cent oil saturation. The chart reads 1.09 and 0.62 respectively for the two quantities in parenthesis. The new PI is, therefore:

$$(PI)_{1500} = \frac{0.62}{1.09}(2.0) = 1.14$$

The accuracy of the chart can be increased for values of k_o/k between 0 and 0.1 by reading at 10 times the k_o/k value given and then dividing the resulting chart answer by 10. The same is true for viscosities above 5.0. They can be read on the chart at one-tenth their value and the resulting chart answer divided by 10 to give the correct decimal.



(Chart constructed by J. R. Everett and F. E. Suder, University of Oklahoma)

Reference

1. Evinger and Muskat, "Calculations of Theoretical Productivity Factor," Trans. A.I.M.E. (1942) 146, 126.
2. Babson, "Prediction of Reservoir Behavior From Laboratory Data," Trans. A.I.M.E. (1944) 155, 118.
3. Muskat and Taylor, "Effect of Reservoir Fluid and Rock Characteristics on Production Histories of Gas Drive Reservoirs," Trans. A.I.M.E. (1946) 165, 78.

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ORBIT FORGED STEEL VALVES

TWO TYPES

1. **Intermediate Temperature Valve— recommended for L P G service. Temperatures to 375° and is stainless steel trimmed for corrosive services.**

2. **Regular Type (Oil Country Type)— recommended for temperatures to 275°, not stainless steel trimmed.**

SIZES:

Refinery Rated — beginning with 2" 150 Lbs. and 2" Series 150 Lbs. Flanged and Threaded Ends.

Oil Country Rated — beginning with 2" 300 Lbs. and 2" Series 300 Lbs. Flanged and Threaded Ends.

Valves shown are 2" Series 150 lb., 500 lb., test.

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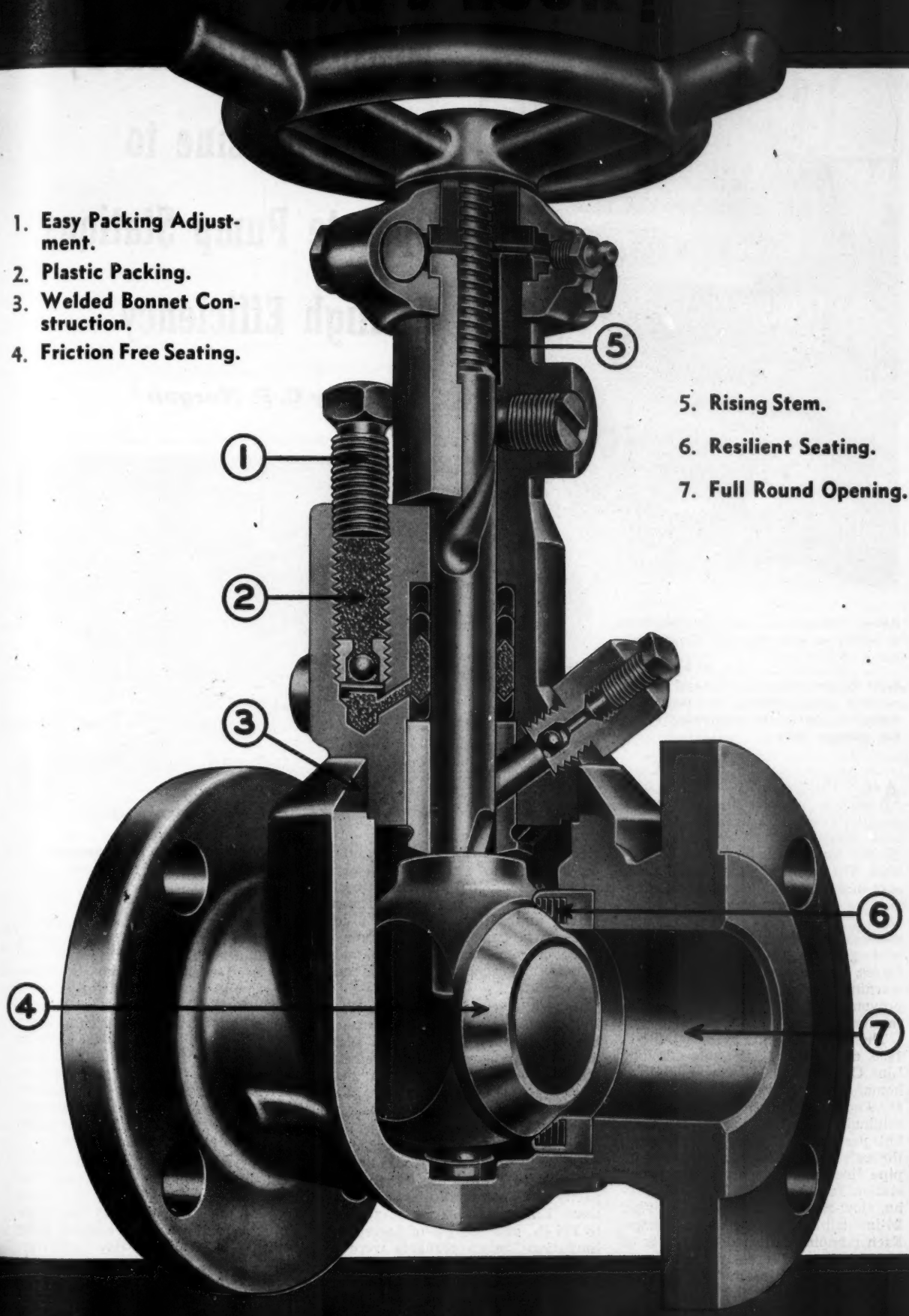
AVAILABLE AT YOUR SUPPLY

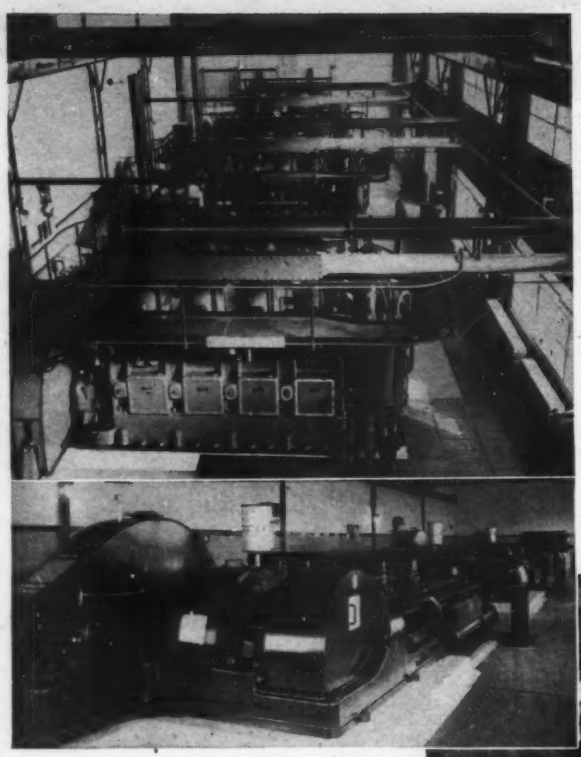
1. Easy Packing Adjustment.
2. Plastic Packing.
3. Welded Bonnet Construction.
4. Friction Free Seating.

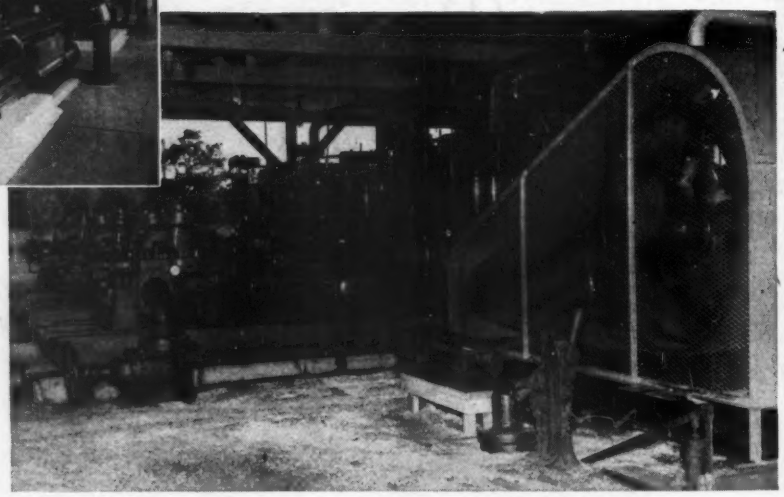


5. Rising Stem.
6. Resilient Seating.
7. Full Round Opening.

Measures Adopted By Ajax Pipe Line to Operate Pump Stations At High Efficiency

by C. P. Morgan *





Above: Typical engine room and pump room at station on Ajax Pipe Line Corp.'s trunk line .

Right: Reciprocating and centrifugal portable pumping units utilized for maintaining throughput during the overhauling of station pumping units

AJAX PIPE LINE CORP. has been able to operate all units at its pump stations and maintain 99.8 per cent maximum possible throughput by the application of several measures. These include the use of portable pumping equipment during overhauling of pumping units; the development of a thorough overhaul procedure; and the installation of closed cooling water systems, lubricating-oil filters, engine pyrometers, safety and warning devices, and mechanical improvements designed and installed by the mechanical department.

The Ajax pipe-line system, built in 1930, connects the Interstate Oil Pipe Line Co. system at Glenn Pool, Oklahoma, and the system of Ohio Oil Co. at Wood River, Ill. The Ajax was originally designed to handle 65,000 bbl. per day at a pressure of 650 psi. through 396 miles of double 10-in. pipe line. This required nine pump stations, each of which had three 500-hp. slow-speed diesel engines driving 24-in. triplex reciprocating pumps. Each pumping unit had a capacity of 32,500 bbl. per day, so two units were necessary to maintain the designed throughput and the third unit was a "spare" or standby unit for use in emergencies. Under these conditions the station crews, consisting of three men to a tour, had sufficient time to make minor repairs and adjustments to the units during the time a unit was down. One mechanical gang of three or four men made the major repairs and general overhauls once each year.

In 1940 it was necessary to relocate the lines near St. Louis because of the construction of a T.N.T. plant, and in the rearrangement an electric station was substituted for a diesel station, so the system now has eight diesel and one electric stations.

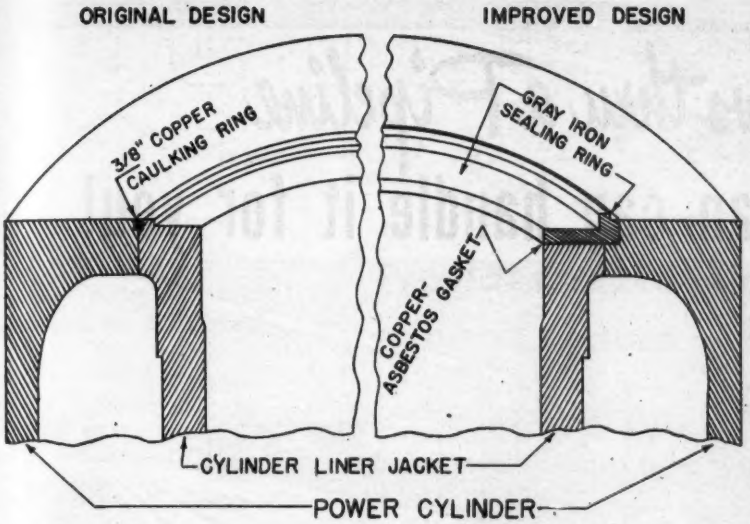
Because of war demands the need for maximum throughput became so great that in April 1942 it was thought practical to exceed the designed capacity and operate all units at all stations. Line pressures were increased to 775 lb., and because of horsepower limitations, pump plungers were reduced so that each unit had a capacity of 30,000 bbl. per day. Under these conditions a maximum yearly average of nearly 85,000 bbl. per day was achieved.

Operating and Maintenance Procedures

This continuous operation of all units at the stations necessitated revision of maintenance and operating techniques. The men on each tour had been reduced to two so station crews could do very little maintenance work. Two mechanical gangs, consisting of four men per gang, were organized and equipped to perform all repair work except that requiring machine tools. These gangs were both under the supervision of the master mechanic, but worked independently, one on the four eastern and the other on the four western stations.

To permit shutting down a permanent unit for repairs or overhaul, the gangs were furnished portable units for use during the period the large units were down. The eastern gang has four 8,000-bbl.-per-day units consisting of 5½ by 12-in. duplex reciprocating pumps driven by 165-hp. diesel engines, all mounted on steel skids. Timber foundations, piping, and sheds are permanently installed

*Master mechanic, Ajax Pipe Line Corp.



Special cylinder liner sealing ring installed to prevent leaking of jacket water when an engine is shut down and allowed to cool

at each eastern station so that the portable units can be quickly moved in or out. The western gang utilizes one unit as described above and three units consisting of 4 by 6 by 10 two-stage centrifugal pumps driven by 165-hp. diesel engines, all mounted on steel skids. The centrifugal units operate in series and have a capacity of 22,000 bbl. per day. This plus the 8,000-bbl.-per-day unit is equivalent to a large unit. Permanent concrete foundations, piping, and sheds are also provided for the units at each western station.

When overhauls are necessary at a station, the mechanical gang moves in, connects the portable equipment, and repairs the large permanent units one by one while operating the portable units in place of the unit being repaired. The overhaul procedure is to pull pistons; replace piston rings; check piston pin and crank bearings; change exhaust, intake, injection, and compressor valves on one unit. After this is done, the unit is put in operation and the same work done on the next unit. When the third unit is completed the first has had some time for piston rings and valves to seat and the unit is again gone over and the main bearings and crankshaft are checked. After this is done on all units, a third inspection is made and the governor, governor drive shaft, lube oil pump, air compressor, and fuel pumps are thoroughly checked and repaired. This triple routine has been proved worth while and in numerous instances breakdowns have been avoided because the units had a chance to run and first adjustments were corrected before the repair gang moved on. If the units were entirely overhauled at one time, the last unit would have no time to operate before the mechanics left. After all units have been overhauled and given a last check, the portable equipment is moved to the next station.

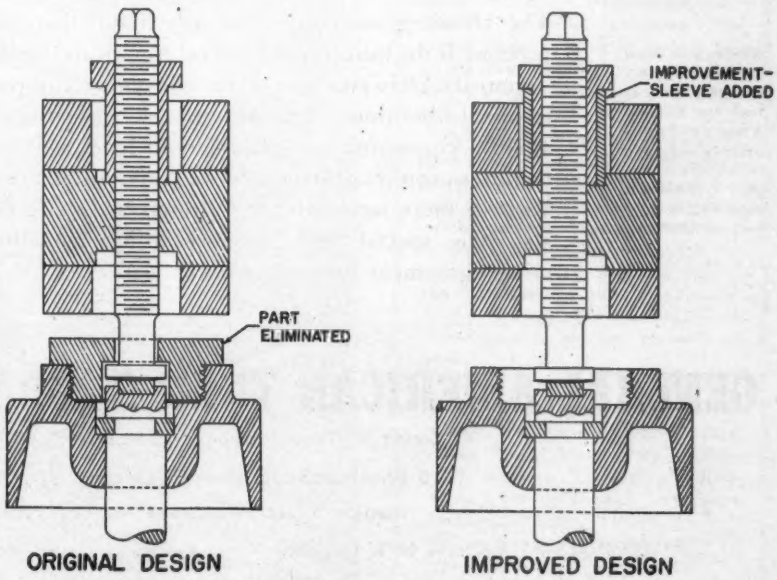
The 500-hp. units are completely reconditioned in this manner about once each year as 3 months are required for each station overhaul. This time includes about 2 weeks for moving, connecting, disconnecting, and repairing of the portable equipment.

In addition to this improved repair procedure, the master mechanic and his crews have devised and installed mechanical alterations and improvements which have prevented breakdowns, reduced operating costs, and speeded up repair time. Some of these are illustrated and described in some detail in the accompanying pictures.

Each engine now has an individual jacket-water cooler of the shell-and-tube type using crude oil for the cooling medium. The heat exchangers are installed on the suction side of the pumps, and the centrifugal pumps for circulating the water are chain driven from the pump pinion shafts. Hand-operated control and bypass valves permit temperature control with full flow always maintained over the engines. These installations have eliminated scale formation and greatly reduced broken engine heads.

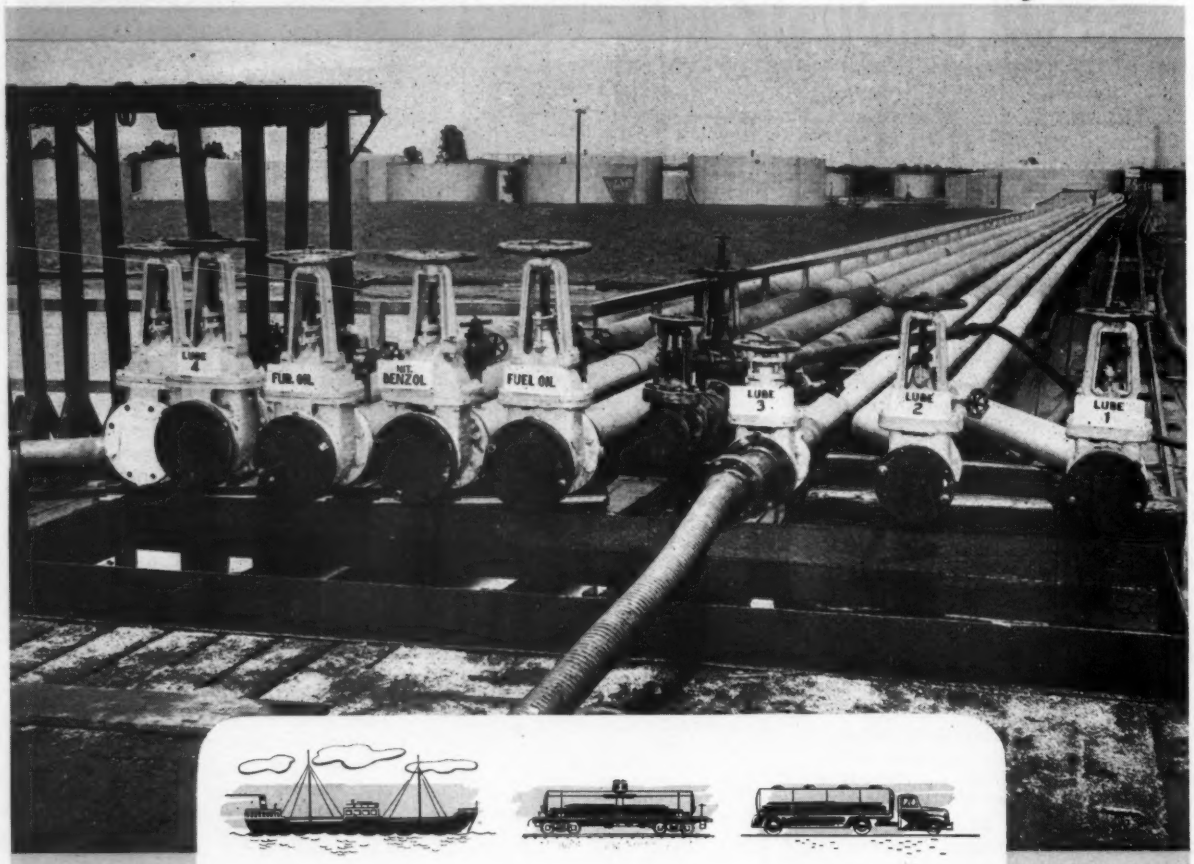
To aid engine adjustments, operation, and maintenance, each Ajax station has been equipped with an indicating pyrometer. This instrument is located on the engine-room wall and is connected to all three engines through thermocouple wire. The exhaust temperatures of all engines can thus be easily determined by turning a dial. The pyrometer

(Continued on page 124)



Redesigned rocker-arm adjusting assembly which eliminates the locking plate

if it Flows thru a Pipeline
General American can handle it for you!



Whether your liquid is shipped by pipeline, ship, truck or tank car, General American Terminals are equipped to handle it, to store it, to blend it according to your own specifications.

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VISUAL *Control System*

by
Leigh S. McCaslin, Jr.

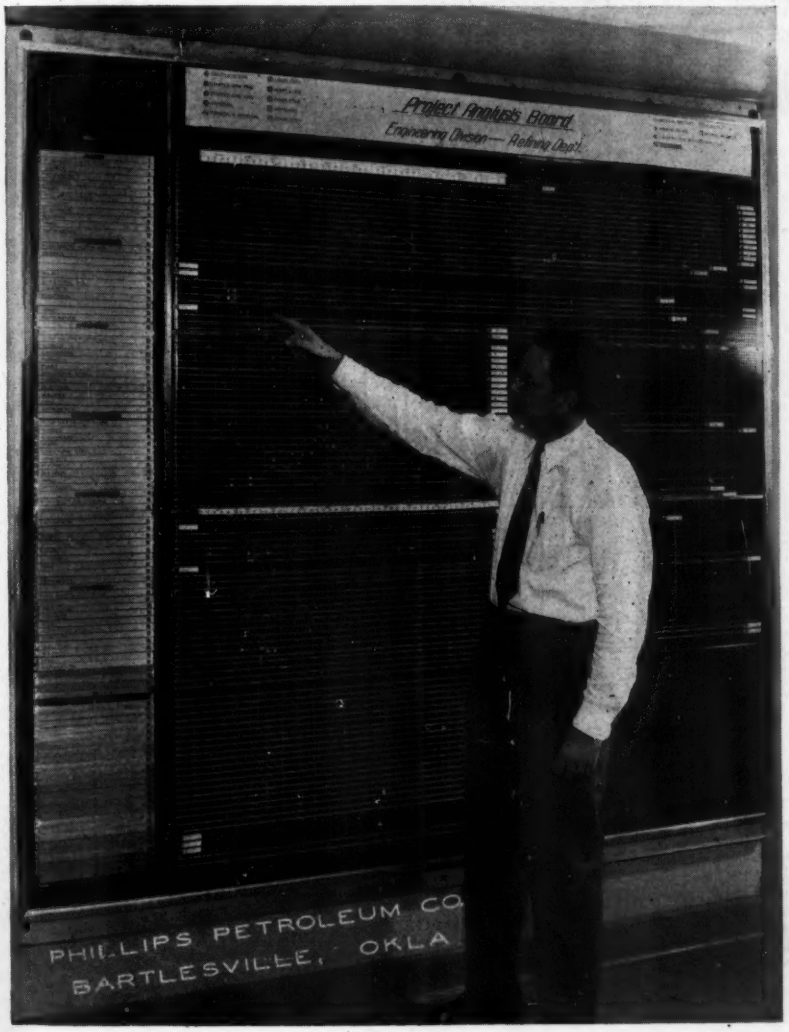
Provides executive or superintendent an over-all picture of operations at a glance

PRODUC-TROL*—a war-born device designed to increase the operating efficiency of a business—is making its debut into the oil industry. In the past year, oil companies in many parts of the country have adopted it. Use has not been confined to any one branch of the industry, but has been adapted for drilling, production, and refining. .

*Manufactured by Wassell Organization, Inc., Westport, Conn. Oklahoma distributor —Wassell Tulsa Co.

What is Produc-trol? As described by its manufacturers, Produc-trol is a "visual control system." In every-day language, it is a board which analyzes ordinary routine paper records in a visual manner. The purpose of the system is to provide for the executive or operating man an over-all picture of an operation or operations at a glance. This "picture" is in sufficient detail to allow the planning, scheduling, measuring, and controlling of various steps in a company's operations.

What are its possible uses? This visual system is very versatile and many uses have been made by industry. Specific use include: Advertising production and traffic, budget control, construction control, cost control, credits control, departmental loading, distribution control, engineering scheduling, expediting, group incentive, individual order scheduling, inventory control, job schedul-

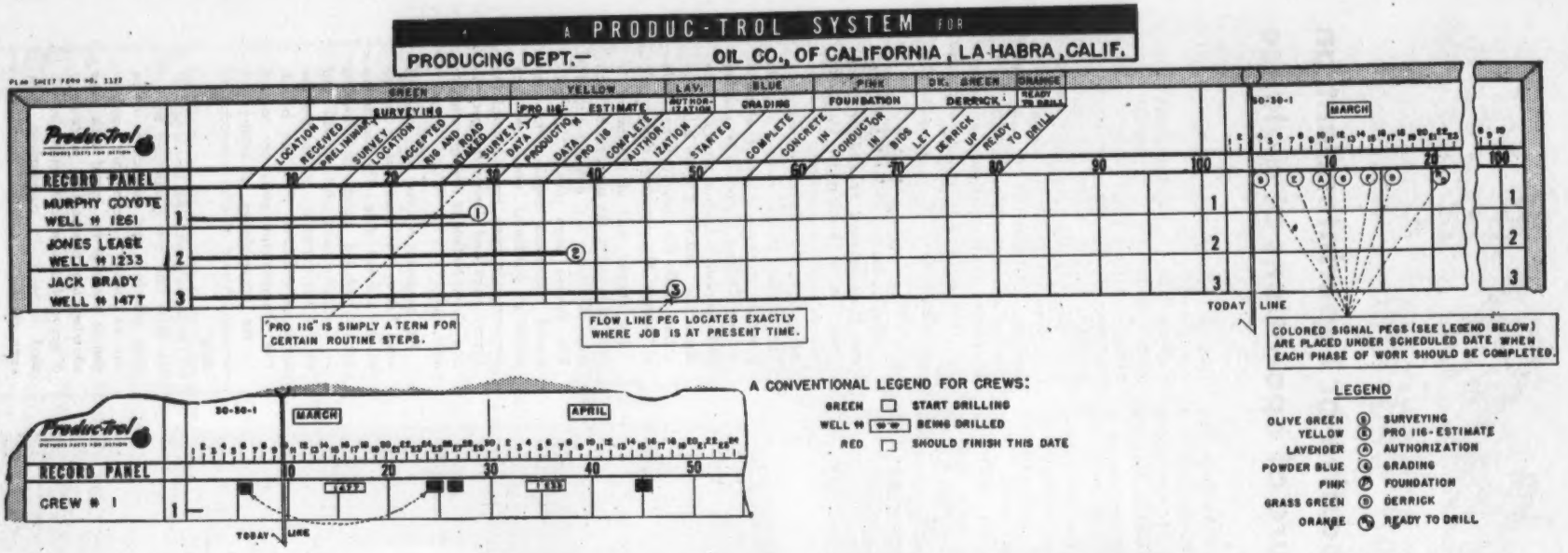


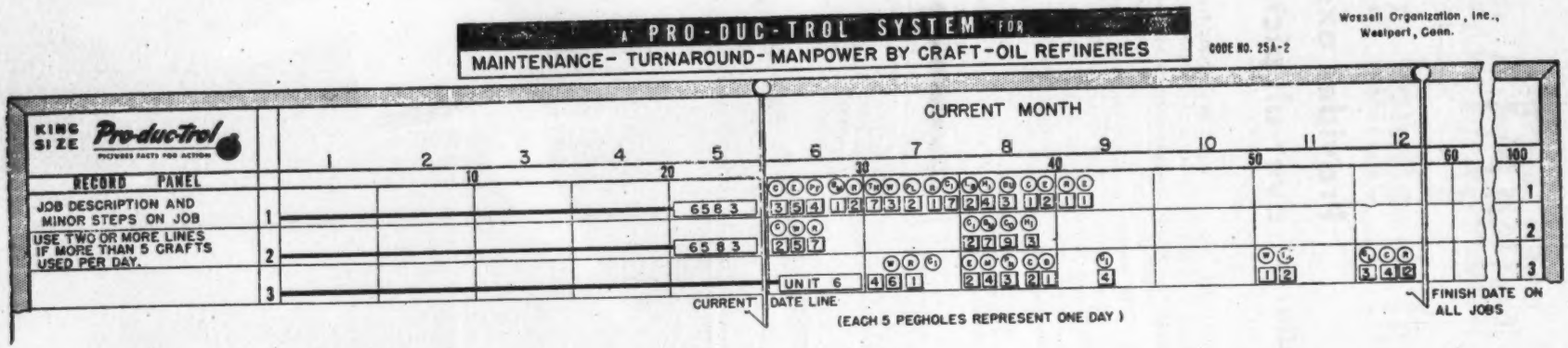
The Produc-trol visual control system is being used by Phillips Petroleum Co. in Bartlesville, Okla., to schedule refinery projects from the design phase through construction. The left half of the board is used to schedule the time sequence of steps in the planned project. The starting and completion dates of each step are based on estimated man-hours required to do the job. Each peg hole represents 2½ working days.

The second half of the board is used to measure the progress of each step and also the over-all project. The square pegs denote the estimated man-hours required to complete a particular operation. The progress-tape pegs move toward the square pegs and denote the percentage of completion of the operation to date.

As progress reports are received each Friday, the date line is moved to the current date. The beginning and completion figures are posted on the permanent card records and as the operations are completed the pegs are removed from the board. The progress-tape pegs are moved to the accumulative percentage of accomplishment of each operation to date.

The pegs remaining to the left of the date line are spotlighted as behind schedule and corrective action can be taken. A secondary application is made of the board with lines showing the progressive percentage of accomplishment of the major scheduled projects in comparison with each other.




A PRO-DUC-TROL SYSTEM FOR
MAINTENANCE- TURNAROUND- MANPOWER BY CRAFT-OIL REFINERIES
Wessell Organization, Inc., Westport, Conn.
CODE NO. 25A-2
KING SIZE Pro-duc-trol
RECORD PANEL
JOB DESCRIPTION AND MINOR STEPS ON JOB
USE TWO OR MORE LINES IF MORE THAN 5 CRAFTS USED PER DAY.
CURRENT MONTH
UNIT 6
CURRENT DATE LINE
FINISH DATE ON ALL JOBS
(EACH 5 PEGHOLES REPRESENT ONE DAY)

LEGEND

-CRAFTS INVOLVED-

PINK	(K)	BLACKSMITHS
RED	(B)	BOILERMAKERS
YELLOW	(BU)	BURNERS
WHITE	(C)	CARPENTERS
OLIVE GREEN	(CI)	COLD INSULATORS
POWDER BLUE	(CB)	CONCRETE & SAND BLASTERS
ORANGE	(E)	ELECTRICIANS
AQUA BLUE	(GL)	GENERAL LABORS
PINK	(HI)	HOT INSULATORS
GRAY	(LB)	LEAD BURNERS
GRAY	(MC)	MACHINISTS
WHITE	(M)	MASONS
LAVENDER	(MI)	METER & INSTRUMENT
GRASS GREEN	(ME)	MOTORIZED EQUIPMENT
ORANGE	(P)	PAINTERS
TAN	(PF)	PIPEFITTERS
YELLOW	(PL)	PLUMBERS
GRASS GREEN	(R)	RIGGERS
TAN	(T)	TINNERS
POWDER BLUE	(W)	WELDERS
WHITE	(4)	NUMBER OF MEN REQUIRED EACH CRAFT

THIS PEG USED ON BOTTOM LINE OF BOARD TO SHOW VERY IMPORTANT OR UNUSUAL ACTION TO TAKE PLACE ON GIVEN DATE.

(E) NEXT TO BOTTOM LINE ON BOARD USED TO SHOW CRAFT INVOLVED EACH DAY.

(1) CRAFT PEGS ARE INSERTED IN SEQUENCE OF WORK TO BE PERFORMED.

(2) FLOW LINE PEG SHOWS NEXT STEP TO BE COMPLETED AND JOB NUMBER.

(3) WHEN JOB IS COMPLETED TAPE PEG IS DRAWN OUT TO FINISH LINE WHICH IS SET NEXT TO LAST PEGS IN BOARD.

(4) PEGS REMOVED AS WORK COMPLETED.

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ing, machine loading, maintenance control, merchandising control, parts into assemblies, personnel control, procurement, production by operation, production scheduling, project control, purchasing, routing, sales analyses, sales by products, sales control, sales incentive, sales potentials, shipping control, storage control, tool control, and vehicle maintenance.

Is it successful? The maintenance superintendent of a refinery claims a reduction in shutdown time of 30 per cent by use of the board. His explanation is that for the first time he is able to see a complete picture of an entire job at one time. The board enables him to line up his work in proper sequence and assign proper manpower to each job.

How does it work? The Produc-trol board has seven major components as follows (see picture):

1. Permanent card records. These records are located at the left side of the board and include a visible index. Permanent card records can be kept for the items or elements under control. Depending upon the size of the particular Produc-trol board being used, 25 to 100 cards can be used.

2. Peg-hole section. The entire area of the board, not covered by the permanent card records, consists of a peg-hole section.

3. Signal pegs. These pegs are inserted in the peg-hole section described above. The pegs make it possible to analyze visually the information on the permanent card records. These pegs are used to indicate "quantity" or "time" values.

4. Progress tape pegs. Cards are used on each line of the board to indicate progress against any predetermined schedule. A peg is fastened to the end of the card so that it may be held on the board at the desired spot.

5. Today line. This is a vertical cord which moves across the board daily indicating the current date. In some cases a different time unit other than a day might be used, such as weekly, bimonthly, etc.

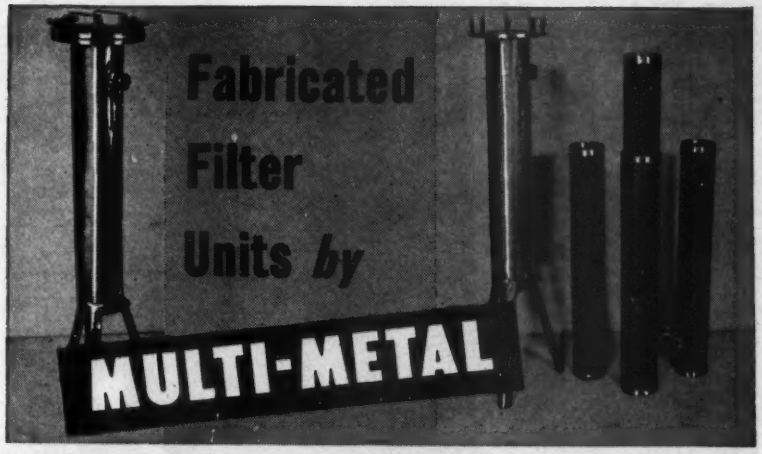
6. Heading strip.—This is a replaceable card strip calibrated in "time" and "quantity" values. This is scaled off to indicate the desired values for the signal pegs.

7. Legend card.—The legend card is placed across the top of the Produc-trol to show the color and shape of the signal pegs being used and what they represent.

Where is it used in the oil industry?—Nineteen oil companies, to date, have installed Produc-trol for various uses. The following detailed description of three installations will give an idea of the possibilities for the oil industry.

Drilling and Producing

The producing department of Standard Oil Co. of California, at



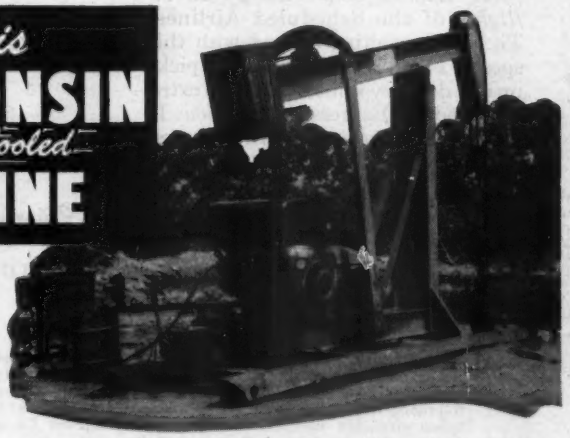
A leading plant in the East brought us their filtering problem. The result: a custom-designed stainless steel filter with four especially designed interchangeable units.

Fabricating filter units of wire and cloth has been our "specialty" for over 35 years. Multi-Metal is equipped to handle the entire operation from wire cloth to final fabrication and assembling. On your next job we invite you to submit your requirements. Let us show you how our fabricating service can offer you short cuts to operating efficiency as well as economies through completely integrated fabrication — all within one plant.

More than 35 years of service to process industries

Multi-Metal
WIRE CLOTH COMPANY, INC.
1350 Garrison Ave., New York 59, N. Y.

This **WISCONSIN** Air-Cooled **ENGINE**



. . . is on the JOB 24-Hours a Day!

It takes heavy-duty stamina and all-weather dependability for an engine to keep plugging away, 24 hours a day, out in the open . . . as this Model VE-4 Wisconsin Air-Cooled Power Unit is doing. You'll find it on the job, any day, any hour, pumping an oil well in Central Oklahoma . . . for a concern that has a full appreciation of the value of heavy-duty design and construction, operating and maintenance economy, and weatherproof serviceability.

Incidentally, another point worth considering is the fact that this Wisconsin Engine is operating on natural gas.

For your power jobs between 2 and 30 hp., specify Wisconsin Air-Cooled Engines. You'll be glad you did if you do.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
510 Atlas Building, Tulsa, Oklahoma
M & M Building, Houston, Texas
Oil field distributors for Wisconsin Engines and all types of utility units.

Supply problems got you all at sea?

Air Express is the *fastest service* you can buy. Use it regularly to ship and receive supplies, equipment and parts. It solves your shortage problems in a matter of hours.

Air Express shipments go on *all flights* of the Scheduled Airlines. There's no waiting around with this speedy 24-hour service. Special pick-up and delivery is included at no extra cost, and Air Express rates are *low*. It pays to standardize on Air Express.

Call on Air Express

Specify Air Express-World's Fastest Shipping Service

- Low rates—special pick-up and delivery in principal U. S. towns and cities at no extra cost.
- Moves on all flights of all Scheduled Airlines.
- Air-rail between 22,000 off-airline offices.

True case history: Dallas motor repair shop regularly gets supplies by Air Express. Keeps equipment rolling. Typical shipment: 60-lb. carton of rubber hose picked up in Indianapolis 5 P.M., delivered 9:30 A.M. following day. 777 miles, Air Express charge only $14.74. Any distance similarly inexpensive. Phone Air Express Division, Railway Express Agency, for fast shipping action.

AIR EXPRESS

GETS THERE FIRST

Rates include pick-up and delivery door to door in all principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE

SCHEDULED AIRLINES OF THE U. S.

La Habra, Calif., is using the Producttrol to make certain that all phases of work necessary before drilling is to start on a test are ready on time. This is considered important in that the payroll for three tours on a drilling rig represent a daily labor expenditure of around $300. Consequently, it is important to have the location in shape for work to commence when the drilling crew is ready to move in.

Fig. 2 shows the items covered by this particular installation. The flow line pegs show the exact status of each drilling location currently being readied by the company. The colored signal pegs are placed under the scheduled date when each phase of the work should be completed.

In addition to the above application that uses up most of the board, 10 lines are used to show the scheduled availability of the company's 10 drilling crews. A date heading strip is used and the board set up as per the insert to Fig. 2.

Refinery-Maintenance Department

At Baton Rouge, Esso Standard Oil Co. used the Producttrol to schedule the sequence of jobs and man-power requirements for a turnaround (see Fig. 3). The procedure used in setting up the board is as follows:

1. It is determined that a certain refining unit is to come down for an overhaul at a certain date.

2. From experience it is known in what sequence individual jobs should be done on the unit.

3. Each job (minor jobs necessary to complete the whole) is assigned to one line or more on the Producttrol board.

4. Crafts are assigned in the order their work should be done. If more than five crafts are involved in a single day, the additional crafts would be shown on the next line.

5. Numbered pegs are placed under each craft peg to show number of men assigned to each craft each day.

6. After all jobs are scheduled, a date line is dropped to pick out the work, crafts, and number of men to be used the first day. If the total of any one craft to be used that day is greater than the number available, the least important job is rescheduled. The date cord is then moved forward 1 day so that the next day's plan can be checked. This continues until the complete control is checked. The control plan itself may be set up as far in advance as desired, and will be ready for use the moment the unit shuts down.

At one major refinery better sequences of jobs have been devised and the necessity of hiring outside help has been eliminated. It is estimated that savings as high as $10,000 per day have been made because of the more efficient planning possible by the use of this system.

JOURNAL-*Guide* TO

Sugar Valley Field

Matagorda County, Texas

SUGAR VALLEY field in northeast Matagorda County, Texas, and particularly its southeast extension lying largely south of State Highway 58, continues as one of the most active drilling areas along the entire Upper Texas Gulf Coast.

Six rigs are now running in the extension, and active development work is expected to take place for a number of months to come. For a time it was considered possible that Sugar Valley might connect over the approximately 2½ miles with Old Ocean field, but a few dry holes in this direction makes this appear less likely.

Sugar Valley now consists of three areas, Sugar Valley proper which was discovered by Superior Oil Co. of California in June 1943 after several deep failures in the area, North Sugar Valley or Ashwood field, and the new South Sugar Valley or east Van Vleck field.

Pay in the original Sugar Valley field was reached at depths from 8,900 to 9,200 ft. In August 1947 Humble Oil & Refining Co. drilled to a total depth of 11,486 ft. in its 1 Truitt & Gravier. This well opened the deeper production south of the main fault between 9,900 and 10,100 ft. Sixteen other oil and condensate wells have been drilled in the southeast extension.

Casing and bits.—Casing usually consists of 10¾-in. to about 2,000 ft. and then the 7 or 5½-in. oil string, depending on depth. One contractor used 19 bits for one well, 8 rock bits and 11 fishtail. The rock bits were used from 3,575-4,524 ft., from 5,069-5,630 ft., and from 8,344 ft. to total depth.

Contract terms.—Drilling in Sugar Valley has been on a straight footage plus day-work basis. Operator prepares the location, supplies fuel, pays for mud, and supplies cement. The contractor supplies substructure and derrick and furnishes water. Steam rigs are used, and the supply of gas available locally for drilling is adequate.

Drilling conditions.—No high-pressure formations have been encountered in the regular field itself, but some trouble along this line has resulted from deep drilling at about 10,300 ft. into the Vicksburg on the outskirts of the field. Sloughing shales have been noted in wells on the edges of the structure. In some cases holes have shown a tendency to deviate at 4,000 to 5,000 ft., and there has been trouble with keyseating as a result.

Miscellaneous.—Total over-all time for one of the deeper wells in the southeast extension was 55 days. This included 4 days rigging up, 48 days spudding, drilling, running casing, and waiting on cement, and 3 days tearing down. Total time on one of the wells in Sugar Valley proper was 42 days, including 6 rigging up and 3 tearing down. Besides Humble and Superior, other major operators in the field are Skelly Oil Co., Sun Oil Co., and Stanolind Oil & Gas Co.

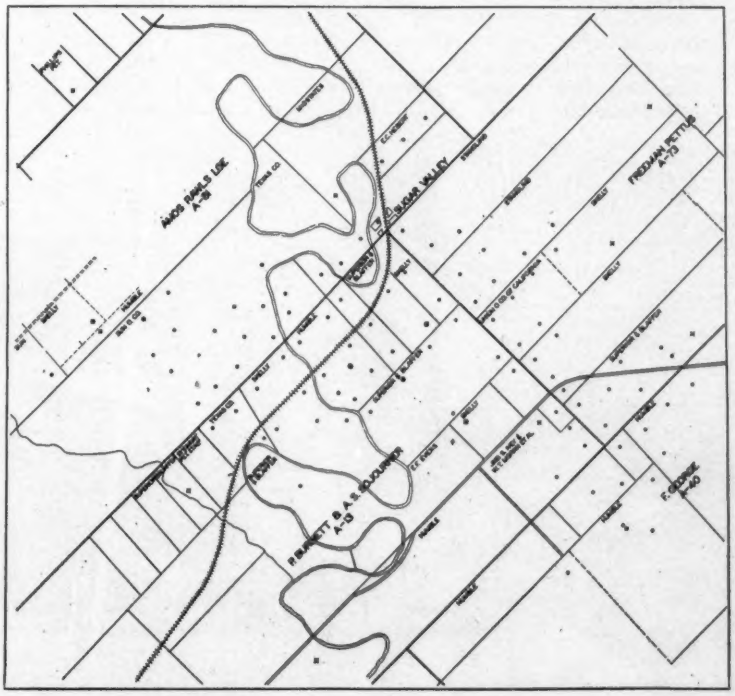
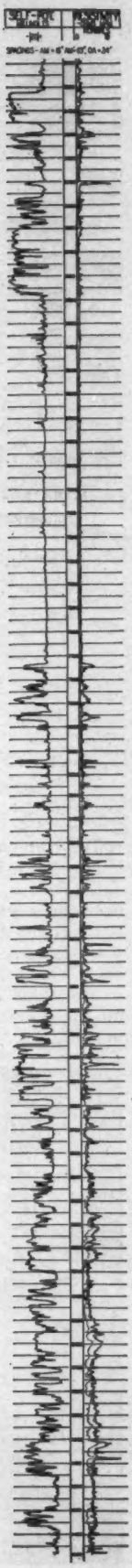


Fig. 1—(Left) Map of active area in Sugar Valley field, Matagorda County. Fig. 2—(Right) Electric log of section from 5,200 to 11,500 ft.



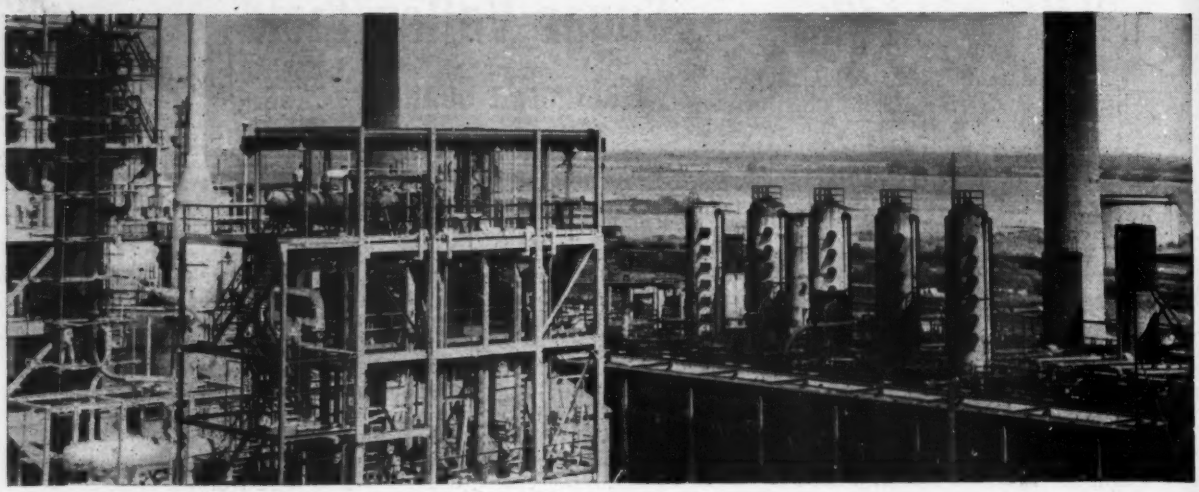


Fig. 1—No. 2 unit, an eight-shell still battery which processes up to 25,000 bbl. of crude per day at Sinclair Refining Co.'s Marcus Hook refinery. Note the newer-type fractionating towers in center, with one of the older type at right, set directly above the shell

Eight-Shell Still Battery Handles 24,000 Bbl. of Crude Daily

by Arch L. Foster

THE conventional shell still is said to be, like the poor, always with us. However, the results which have been achieved by "mixing shell stills with common sense," said one forward-looking but practical refiner some years ago, "has produced some of the most useful operations known for the refiner." Sinclair Refining Co., in its Marcus Hook, Pa., refinery, has developed over many years a method and system of operating two shell-still batteries which handle all of the 65,000 bbl. per day of crude-distilling capacity in that plant.

This is the brief story of one of those batteries, taken as typical of the system of operation and its results. The eight shells comprising this battery are interconnected so that the bottoms from each "lower" still are introduced into the next shell continuously throughout the operation. Two steam lifts are installed for each shell to transfer the reduced crude to its next "stop" in the process, each still being provided with a charge bypass line.

The first four stills have what are called primary fractionator towers,

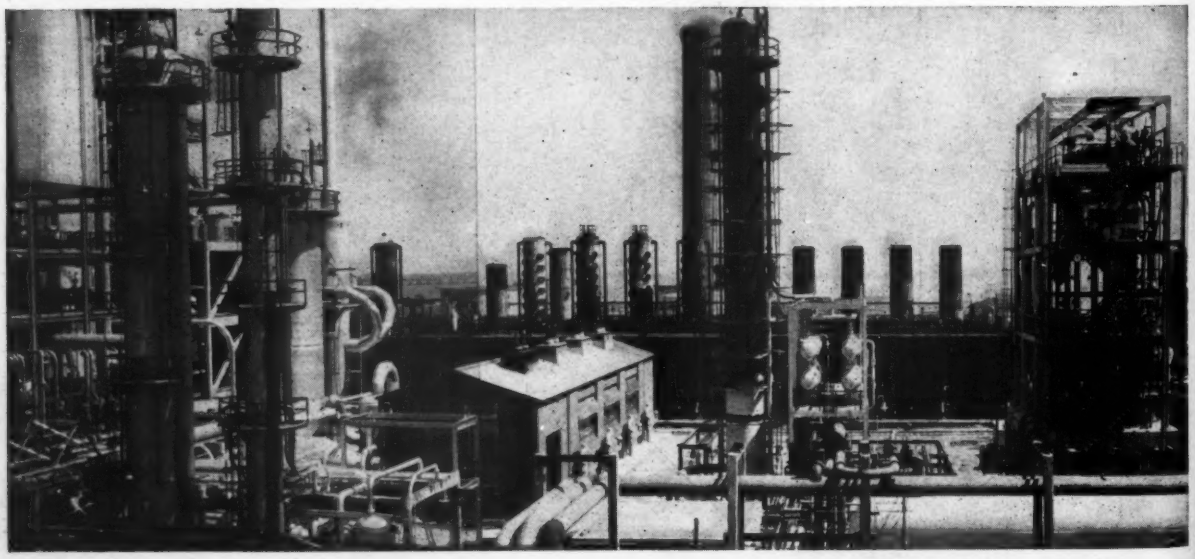


Fig. 2—Nearer view of shell still battery No. 2 at Marcus Hook. In center background are the newer towers, while left and right are the older towers. Towers and equipment in left, center, and right foreground belong to other units in the plant

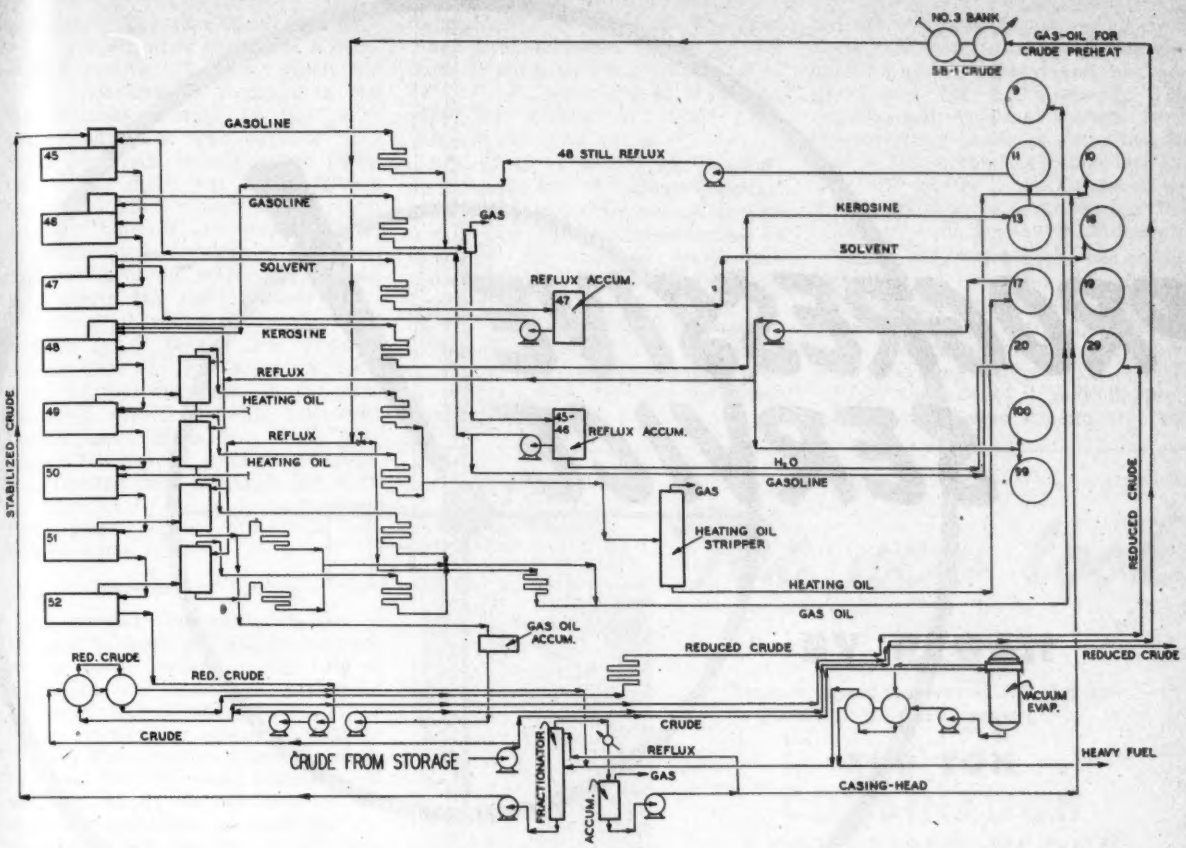


Fig. 3—Flow diagram of the Sinclair still battery, showing connections and reflux lines and other details of the assembly

that is, fractionators set directly over and above the shell from which they receive vapors. The second four stills have what are termed secondary fractionators, that is, the towers are set directly above the condenser boxes, and vapor lines extend from the top of the shells to these towers to deliver the vapors for fractionation. These "goosenecks" are approximately 50 ft. long.

Stills Nos. 49 and 50 have liquid runbacks extending from the base of the towers to the shells; no runbacks are provided for stills Nos. 51 and 52. Still Nos. 45, 46, and 47 have two feed nozzles instead of one; one introduces crude into the shell directly, the other enters the corresponding tower just above the last or topmost baffle plate.

Air preheaters are provided for each still, in which heat is exchanged between forced air and existing hot

TABLE 1—SINCLAIR REFINING CO. SB-2 BATTERY SURVEY, LABORATORY INSPECTION SHEET (SANTA BARBARA CRUDE)

	Crude	Fract. Liq. O'head	Fractionator Rel. Gas	Fract. Btms. to 45 Still	Gasoline 45-46 St. O'head	Solvent 47 Still O'head	Kerosine 48 Still O'head	Heat. Oil 49-50 St. O'head	Gas Oil 51-52 St. O'head	Red. Crude 52 Still Butts
Gravity, °A.P.I.	31.5	75.8	1.9849	29.4	59.2	46.0	41.3	34.6	28.2	16.9
Sulfur	0.95	0.047	Trace	0.77	0.024	0.046	0.100	0.37	1.04	1.66
R.S.H.	....	Nil	.....	....	0.19	Trace	0.26	....	....	....
H_2S	....	Nil	.....	....	Nil	Nil	0.0	....	....	....
Diesel index	....	....	.....	....	....	....	56.3	54.5	47.4	....
Cetane delay	....	....	.....	....	....	....	49.0	47.5	44.6	....
Pour	30	....	.....	B-10	....	....	—70	B-10	65.0	75
Aniline point	....	....	.....	....	115.5	115.0	136.5	157.4	168.7	....
Viscosity at 100 S.S.U.	58	....	.....	63	....	....	*395	35.5	69.5	†207
SED by extraction	....	....	.....	....	....	....	....	....	0.18	1.24
Carbon residue, 10 per cent butts	....	....	.....	....	....	....	....	0.03	0.54	....
R.v.p.	2.0	24.6	.....	0.5	5.0	....	....	....	....	....
A.S.T.M. distillation:										
I.b.p.	168	....	.....	176	130	317	374	438	236	520
10 per cent	273	....	.....	331	176	324	386	476	573	672
20	380	....	.....	415	200	327	394	488	597	....
30	456	....	.....	496	214	330	398	497	613	700
40	556	....	.....	570	227	332	404	505	632	712
50	621	....	.....	645	238	334	410	514	649	728
60	679	....	.....	694	248	336	416	524	668	Cracked
70	708	....	.....	724	257	339	422	536	689	....
80	728	....	.....	737	268	343	432	549	710	....
90	731	....	.....	748	284	350	444	573	747	....
End point	....	....	.....	....	344	398	474	640	760	....
Recovery, per cent	....	....	.....	....	98	98	98	98	96	....
Flash, P.M., °F.	....	....	.....	....	....	104	148	176	84	....
Solvency	....	....	.....	....	....	45.8	40.0	....	....	....

*Therm. †Viscosity at 210 Furol; carbon residue 6.9.

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flue gases. The two steam lifts provided for all other shells are not installed on No. 52, from which the heavy residuum is pumped in the conventional manner to the other processing units. The outflow lines from the shells extend to the firing end of the shell, that is, the hottest end of the shell nearest the burners, and the bottoms are drawn off by the steam lifts through these lines, the entrances to which are placed 1 ft. above the shell bottom.

Each shell is 14 ft. in diameter and 42 ft. in length. The primary towers on stills Nos. 45-48 are each 8 ft. in diameter and 35 ft. high, equipped with four baffle and eight bubble trays. Stills Nos. 49-52, producing the heavier fractions of burning, heating, and fuel oils are 8 ft. in diameter by 24 ft. high, have no baffle plates, but are fitted with four bubble trays each.

Operation of Battery

In normal operation, crude is charged to heat exchangers external to the crude battery at the rate of 1,000 bbl. per hour, and preheated to about 380° F. It is flashed in a crude fractionator where light gasoline vaporizes overhead, and the crude at about 347° F. enters stills Nos. 45 and 46. About 80 per cent of the volume enters No. 45 still, the remainder going into No. 46 still. Top temperature on No. 45 still fractionator is held at approximately 210° F. with reflux. Gasoline vapors from this still are condensed and flow to a reflux accumulator combined with the heavier gasoline fraction from No. 46 tower, the overhead temperature of which is maintained at 215° F. From the accumulator the major portion of the gasoline is pumped to storage, condensed water being drawn from the accumulator bottom. Still-bottom temperatures for these two stills are about 400° and 425° F. respectively, with pressures at 18-19 psia. Pressure in each succeeding still drops 0.3 to 0.4 lb. from that maintained normally in the still next in front of it in the flow sequence.

A solvent naphtha fraction of approximately 47° A.P.I. from an Eastern Venezuelan crude, for example, is taken overhead from No. 47 still and sent to separate storage. From No. 48 still a kerosine fraction is taken, of about 41.0°-41.5° A.P.I. Overhead temperatures on these two stills are 290° and 400° F. respectively; still-bottom temperatures are about 460° and 510° F.

Still No. 49 operates with its tower some 50 ft. distant as mentioned above. At 547° F. still temperature and 475° F. tower overhead temperature, a heating-oil fraction is taken overhead which after condensation is combined with the overhead from No. 50 still, operated at 605° F. bottom and 490° F. overhead. The combined stream passes to a stripper from which a stripped heating oil of 34°-35° A.P.I. gravity goes to storage, supplying reflux for both stills through the same pump.

Stills Nos. 51 and 52 are operated at 555° and 490° F. bottom temperatures and send their overhead streams into two secondary towers which in this case are used as knock-back drums rather than as fractionators. Liquid from the bottom of the secondary towers is pumped through an exchanger system and a portion of it is returned to the knock-back tower as hot reflux. Thus all the latent heat of vaporization is recovered and the net overhead gas oil make from these two stills is taken off the circulating reflux system and has approximately 28° A.P.I. gravity. The conventional overhead system from the secondary tower is left intact so that if the circulating reflux system fails, the vapors from the secondary tower will then go down through the condenser coils and on to tankage.

No. 52 still, which is the last in the still battery, operates at slightly above atmospheric pressure and produces 17.5° A.P.I. gravity reduced crude bottoms which are pumped to other operating units.

From the above, it may be seen that a total of nine streams are pro-

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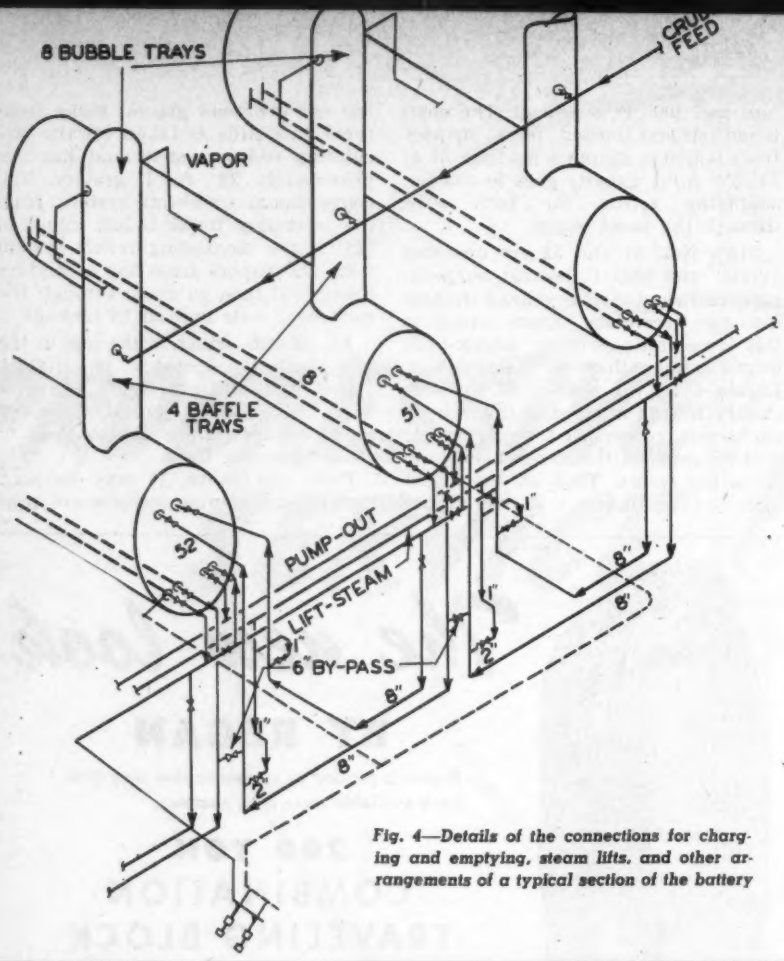

Fig. 4—Details of the connections for charging and emptying, steam lifts, and other arrangements of a typical section of the battery

duced from the crude battery. These streams vary from a light gasoline of 76° A.P.I. gravity which is taken off from the preheat fractionator down to the 17.5° gravity reduced crude. Adequate fractionation is provided to obtain the degree of separation between fractions to yield the specification on the stream, as required by the refinery's product completion demands. The accompanying tabulations of inspection data on the various streams may be considered as typical of one plan of operation. Since these data represent results on a given composite charge stock, they may or may not agree with other typical values given in the text, which are taken from an operation differing more or less in details. From the group of main streams as taken from this battery any combination of products desired may be blended.

Hearing Is Set August 23

The Federal Power Commission has consolidated proceedings on applications filed by El Paso Natural Gas Co., Southern California Gas Co. and Southern Counties Gas Co. of California and has set the hearing to open August 23. (For details of the proposed facilities by the companies involved, see The Oil and Gas Journal, July 29, page 293 and August 5, page 119).

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Properties of Hydrocarbons

Can you direct us to a recent tabulation of the properties of the lower gaseous hydrocarbons which shows the critical viscosity? We are also interested in the octane number, and the ratio of specific heats.—R. E. M.

The values of the properties of hydrocarbons are being revised so constantly that a new one is always in order. The two tables on this page give the desired information for some common paraffins, olefins, and other gases. The critical viscosity data were taken from information and a correlation formula published by Uyehara & Watson (A Universal Viscosity Correlation, Nat. Pet. News, Tech. Sect., October 4, 1944). Most of the other information was taken mainly from "Physical Constants of the Principal Hydrocarbons," compiled by M. P. Doss of The Texas Co.

TABLE 1—PROPERTIES OF PARAFFIN HYDROCARBONS*

	Methane	Ethane	Propane	i-Butane	Butane	i-Pentane	Pentane	Hexane	Heptane	Octane	2,2,4-trimethyl pentane	Cetane
Molecular weight	16.03	30.05	44.06	58.08	58.08	72.09	72.09	86.11	100.13	114.14	114.14	226.43
Carbon-hydrogen ratio	2.98	3.97	4.46	4.76	4.76	4.96	4.96	5.11	5.21	5.30	5.30	5.62
Liquid:												
Specific gravity, 60/60	0.300	0.374	0.509	0.563	0.584	0.625	0.631	0.664	0.688	0.707	0.696	0.799
Density, lb. per gal. at 60° F.	2.5	3.12	4.24	4.70	4.86	5.20	5.26	5.53	5.73	5.89	5.80	6.65
A.P.I. at 60° F.	340	247	147	120	111	94.9	92.7	81.6	74.2	68.6	71.8	50.1
Vapor:												
Gravity, relative to air	0.559	1.037	1.521	2.004	2.004	2.494	2.491	2.975	3.459	3.943	3.943	7.817
Cu. ft. per gal. liquid	59.1	39.2	36.5	30.6	31.8	27.3	27.5	25.5	20.8	19.6	19.2	10.87
Boiling point, °F.	—259	—128	—44	10.9	31.1	82.2	96.9	155.7	209.2	258	210	536
Critical:												
Temperature, °R.	344	549	665	733	765	829	846	914	976	1,022	975	1,300
Pressure, psia.	673	715	616	543	550	483	484	440	405	370	397	222
Volume, cu. ft. per lb. mol.	1.59	2.29	3.12	3.99	4.14	4.93	4.97	5.88	6.85	7.86	.....	16.5
Viscosity, micropoises	159	210	228	239	239	240	238	248	254	259	.....	.....
Specific heat:												
Vapor	[2]0.543	[3]0.410	[5]0.473	[5]0.462	[6]0.459	[9]0.471	[10]0.409	0.339	0.335	0.330	.....	.....
Liquid at 60° F.	.....	0.78	0.6	0.56	0.55	0.53	[11]0.54	[12]0.531	[13]0.53	0.517	0.492	[14]0.495
Ratio at 60° F.	1.31	1.18	1.15	1.11	1.10	.....	1.120	1.11	1.11	1.10	.....	.....
Coefficient of expansion	[15]0.00368	0.0038	[16]0.00324	[16]0.00230	[16]0.00203	[17]0.00155	[7]0.00154	[7]0.00135	0.00122	[7]0.00116	.....	0.0008
Inflammability, limits:												
Low	5.3	3.2	2.4	1.8	1.9	1.3	1.45	1.2	1.0	0.9	.....	.....
High	14.0	12.5	9.5	8.4	8.5	.....	7.8	6.9	6.0	.....	.....	.....
Heat of combustion:												
Gross, B.t.u. per lb.	23,920	22,350	21,690	21,290	21,340	21,060	21,120	20,970	20,860	20,780	20,560	20,360
Net, B.t.u. per lb.	21,540	20,450	19,960	19,650	19,700	19,470	19,540	19,420	19,340	19,270	19,060	18,920
Gross, B.t.u. per cu. ft.	1,011	1,770	2,520	3,261	3,266	4,004	4,016	4,762	5,508	6,254	6,190	.....
Latent heat, B.t.u. per lb.	225	210	183	158	165	146	154	145	137	130	117	76
Vapor pressure at 100° F., psia.	.....	221	189	73.5	52	20.3	15.5	5.0	1.63	0.54	1.0	.....
Octane number, A.S.T.M.	100+	100+	99.5	97	92	90.3	61.9	26	0	—17	100	.....
P_1/W_1, expansion constant for liquids	3.679	4.416	4.803	.....	5.002	.....	5.128	5.216	5.290	5.34	.....	5.48

TABLE 2—PROPERTIES OF VARIOUS HYDROCARBONS*

	Acetylene	Ethene	Propene	i-Butene	Butene-1	1,3-Butadiene	Pentene-1	Cyclohexane	Benzene	Toluene	Alpha methyl naphthalene	Cetene
Molecular weight	26	28	42	56.1	56.1	54.09	70.1	84.1	78	92.1	142.19	224.42
Carbon-hydrogen ratio	11.91	5.96	5.96	5.96	5.96	7.77	5.96	5.96	11.91	10.43	13.11	5.96
Liquid:												
Specific gravity, 60/60	0.416	0.351	0.522	0.600	0.601	0.627	0.647	0.778	0.844	0.872	1.028	0.788
Density, lb. per gal. at 60° F.	3.47	2.82	4.35	5.00	5.01	5.22	5.40	6.48	7.03	7.27	8.56	6.56
A.P.I. at 60° F.	209	273	140	104	104	94	87	50.3	28.6	30.8	6.2	48.1
Vapor:												
Gravity, relative to air	0.906	0.968	1.453	2.011	1.937	1.877	2.421	2.905	2.696	3.181	4.909	7.748
Cu. ft. per gal. liquid	50.5	39.6	39.5	32.6	33.8	36.4	29.1	29.4	36.8	29.9	22.85	11.09
Boiling point, °F.	—119	—155	—54	19.6	20.7	23.6	86.2	177.4	176.2	231.1	469.4	525.2
Critical:												
Temperature, °R.	522	510	657	762	751	785	845	998	1,010	1,068	.....	.....
Pressure, psia.	911	748	660	580	620	617	594	585	703	611	.....	.....
Volume, cu. ft. per lb. mol.	1.81	2.04	2.88	3.84	.....	.....	.....	4.93	4.1	5.05	.....	.....
Viscosity, micropoises	237	215	233	250	.....	.....	.....	284	312	306	.....	.....
Specific heat:												
Vapor	0.407	[3]0.365	[5]0.371	[5]0.362	0.371	0.332	.....	.....	.....	.....	.....	.....
Liquid at 60° F.	.....	.....	0.57	0.55	0.53	0.551	.....	[5]0.440	[6]0.414	[6]0.398	.....	0.4723
Ratio at 60° F.	1.27	1.24	1.16	1.13	1.11	1.12	.....	.....	.....	.....	.....	.....
Coefficient of expansion	0.0037	[6]0.00689	0.0017	[6]0.00187	[6]0.00191	0.0018	.....	[7]0.00120	[7]0.00121	[7]0.00106	.....	.....
Inflammability, limits:												
Low	2.5	2.7	2.0	.....	1.7	2.0	1.6	1.3	1.4	1.3	.....	.....
High	80.0	28.6	11.1	.....	9.0	11.5	.....	8.3	6.7	6.7	.....	.....
Heat of combustion:												
Gross, B.t.u. per lb.	21,580	21,650	21,060	20,740	20,860	20,230	20,720	20,290	18,225	18,470	.....	20,316
Net, B.t.u. per lb.	20,850	20,300	19,700	19,380	19,500	19,180	19,360	18,930	17,490	17,640	.....	18,957
Gross, B.t.u. per cu. ft.	1,489	1,601	2,335	3,066	3,084	2,968	3,829	4,500	3,750	4,480	.....	.....
Latent heat, B.t.u. per lb.	296	208	189	169	168	177	148	155	170	155.5	.....	.....
Vapor pressure at 100° F., psia.	105	397	226	59.4	62.6	64.7	19	3.3	3.4	1.0	.....	.....
Octane number, A.S.T.M.	.....	81	85	87	80	.....	.....	78.6	113.6	104.2	.....	.....

*The reference numbers accompanying some of the data refer to the temperatures in °C. at which the data are applicable, as follows: [1]18°, [2]15.5°, [3]25.9°, [4]27°, [5]30°, [6]—17.8-10°, [7]0 to 30°, [8]15°, [9]100°, [10]86°, [11]17°, [12]22°, [13]26.2°, [14]0 to 50°, [15]0 to 100°, [16]10 to 37.7°, [17]5 to 10°.

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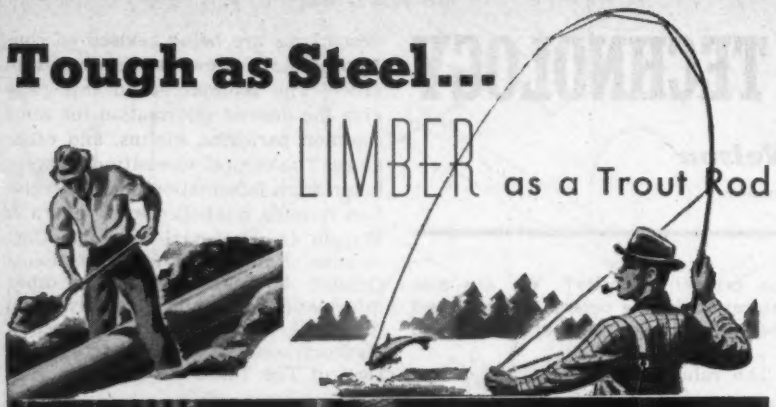

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Preparation of Drilling Muds

(Continued from page 102)

The effect of the volume of mud in the mill is strikingly illustrated for the HB-10 (8 per cent) system. The smaller batch milled for a given period of time is more effectively dispersed and the viscosity is therefore higher for a comparable milling period than for the larger batch. The properties of this mud system are also very sensitive to the length of time in the mill. Increasing the milling period for the 1,000-g. batch from 20 to 80 minutes resulted in a viscosity increase from 6 to 19 cp. With bentonite and the other systems reported in Table 4 the effect of milling is not pronounced.

The results of Table 4 show that the changes which occur upon aging the muds after milling may vary considerably with different systems. Thus, suspensions of Wyoming bentonite (B) exhibit only a small change while the Rogers Lake clay system has a marked increase in viscosity.

These effects of milling and aging are not surprising. In any colloidal system, particularly with impure clays, equilibrium conditions are frequently approached slowly. For example, Hauser and Reed[2] have shown that even with purified suspensions of bentonite, measurable changes in properties occurred over a period of 28 days. Marked changes which might occur are in particle charge, hydration, and agglomeration or dispersion of the particles. Another factor which may be involved in the milling process is suggested by published data[3,4] which show that fine grinding may disrupt the crystal lattice of clays and alter the properties of the material. The importance of the milling process for the preparation of these muds may be largely attributed to the vigorous shearing action so that any other physical operation encountered in subsequent tests does not appreciably increase the degree of dispersion.

C. Preparation of standard muds.—For numerous experiments, such as those just described, the procedure for the preparation of muds has been standardized as follows. The clays are dispersed in the water using the Eppenbach QV-6 colloid mill, the milling period being 20 minutes at the coarse setting and then 20 minutes at the fine setting. Weighting agents, if incorporated in the muds, are then added and dispersed by vigorous stirring or shaking. Finally, the mud is aged 24 hours to obtain a comparatively stable system.

The composition of a limited number of muds which have had extensive application as laboratory standards are presented in Table 5. The compositions as reported are for stock suspensions. For use, the muds are

introducing . . .

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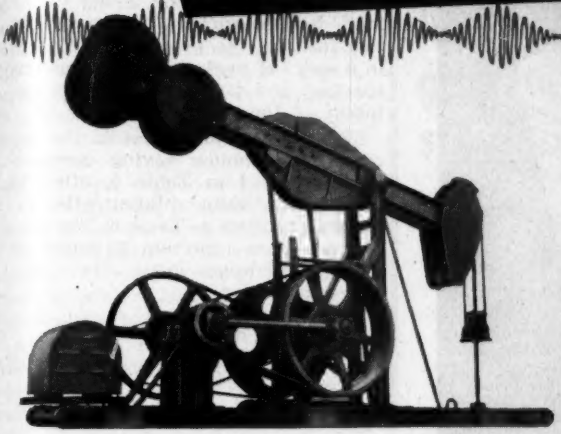

Stroke Cycling, a revolutionary new pumping principle, pumps oil wells more economically and productively. Whether operated with Stroke Cycling or as a conventional pumper the new Baroid mechanism eliminates pitman, gear boxes, crank pins, expensive tie downs or foundations. It can start operating a few minutes after being spotted. Its unique power transmission cuts power requirements to a minimum.

Stroke Cycling causes the pump stroke to vary continuously from full rated stroke to zero and back again. Stroke Cycling has these major advantages:

1. Distributes wear on rods and pump.
2. Eliminates need for electrical intermitter.
3. Operates regardless of power source.
4. Maintains substantially constant fluid levels.
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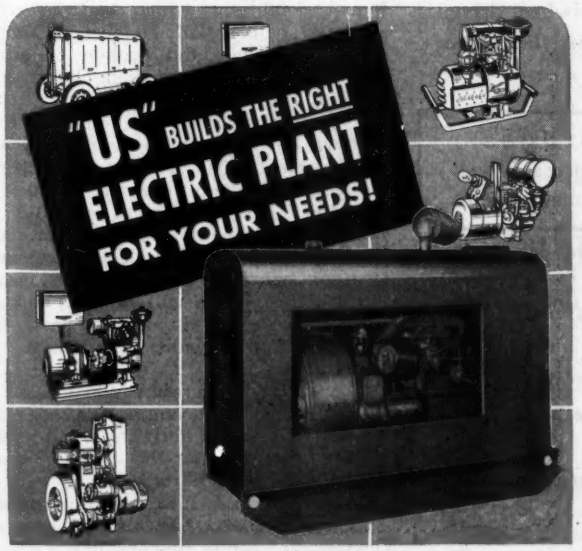

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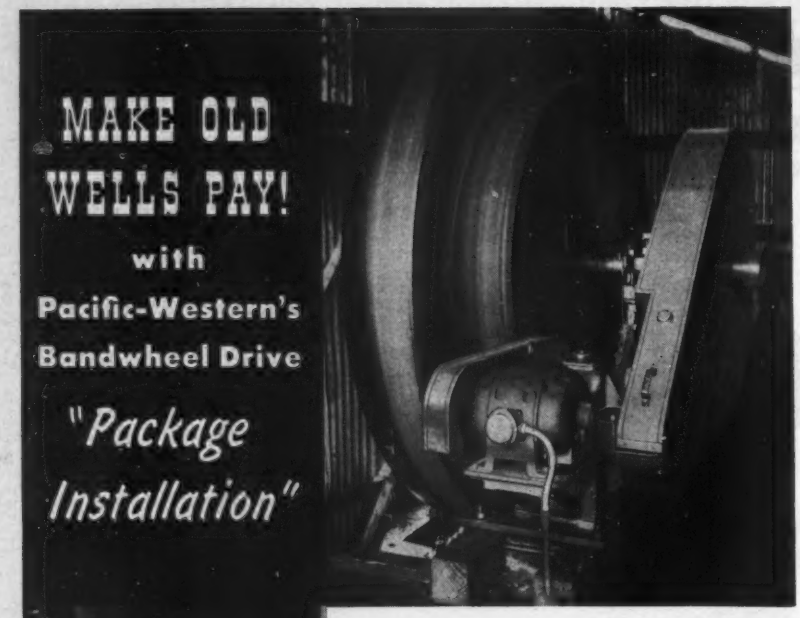

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diluted with 20 per cent by volume of water (5 vol. of mud to 1 vol. of water). This dilution permits the treatment of the muds with solutions of various electrolytes or other substances which may be added to the mud for experimental purposes. In this manner, the percentage of clays in a series of muds so treated remains constant and facilitates the interpretation of the results.

The physical properties of the various stock muds, having compositions reported in Table 5, after 20 per cent by volume dilution with water are reported in Table 6. The tabulated values represent averages of many preparations made over a several-year period.

References

1. Grim, R. E., Jour. of Geology, Vol. L, 225 (1942).
2. Hauser, E. A., and Reed, C. E., Jour. Phys. Chem. 40, 1169 (1946); ibid 41, 911 (1937).
3. Kelly, W. P., Dore, W. H., and Brown, S. M., Soil Sci. 31, 25 (1941).
4. Marshall, C. E., Jour. Phys. Chem. 41, 935 (1937).

Operate Pump Stations At High Efficiency

(Continued from page 107)

helps the operators to keep cylinders evenly loaded and to discover abnormal conditions which can be corrected before damage occurs. Many burned valves and broken cylinder heads have been avoided because of these instruments.

Certain warning and engine-shutdown devices have been installed on all engines. Ajax is using an electric-controlled lube-oil pressure shutdown device. This instrument operates a magnetic valve on fuel line near fuel pump, and when lube-oil pressure drops below a predetermined pressure, the engine will be shut down. This protects all moving parts of engine that depends on pressure lubrication.

A water-temperature alarm is also installed on each engine. This device operates a signal horn and a red light. The light indicates the engine where trouble exists.

A high and low pump-discharge pressure alarm has also been provided to warn of line and pump valve trouble. This instrument is mounted on the recording pressure gage.

In addition to these extras certain improvements have been made on the engines themselves and a few of these will be described.

Cylinder jacket water seals previously in use on engines on the western half of the Ajax system consisted of a ⅜ in. copper caulking ring in a groove equally between liner and cylinder jacket. Because

expansion and contraction of the copper ring was different from expansion and contraction of iron, the joint would leak water when the engine was shut down and allowed to cool. To stop the leaks required removal of cylinder heads and recaulking the copper ring, after which the leaks came back when the engine was again shut down. To overcome this, the liner and cylinder jacket were machined with a portable boring bar to take a machined sealing ring and copper-asbestos gasket. The sealing ring is made of quality iron and has the same expansion and contraction as liner and cylinder liner jacket. This improvement has saved makeup water and labor required for stopping leaks.

Ajax has experienced considerable trouble with main engine connecting rods in use in engines on the western half of the system. The original rods used an eccentric-babbitted cast-iron piston-pin bushing which seldom withstood 1 year's operation and in some instances the rod eye was broken when the bushing failed. To correct this weakness a new rod was designed with stronger eye and using a brass bushing instead of the babbitted bushing. These rods have proved satisfactory and have prevented breakdowns and mechanical repairs.

The inlet and exhaust-valve cages in use on some of the Ajax engines were originally of one-piece construction, and when worn or burned beyond repair, it was necessary to junk the entire cage. As redesigned the cage has a removable seat and therefore only the seat need be discarded.

Original main crank-pin bearings were of the usual cast-steel babbitt-lined type which lasted about 18 months. Those were replaced with precision - type brass - shell babbitted bearings which have a normal life of about 2 years and cost about 40 per cent of the price of rebabbitting old-type bearings.

A redesign of the rocker-arm adjusting assembly resulted in a saving of 15 minutes for each valve change. The alterations eliminate the locking plate formerly holding the rocker arm adjusting screw to the valve.

The best combination of rings for engines on the Ajax system are standard compression in grooves 1, 2, and 3; seal-cut compression in grooves 4, 5, and 6; standard oil-control in groove 7; and ported beveled scraper oil rings in grooves 8 and 9. On engines using seven rings instead of nine, standard compression rings are used in grooves 1 and 2; seal-cut compression in grooves 3, 4, and 5; standard oil-control in groove 6, and beveled scraper drain oil ring in groove 7. Rings are selected to be perfectly round when inserted in cylinder. Also they must be flat and have proper side clearance, so as not to freeze in

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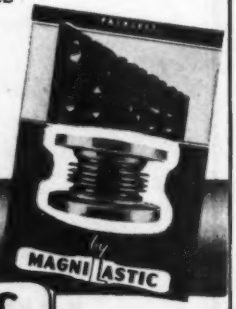

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grooves. These ring combinations are considered a great help in obtaining the low oil consumption of 58 gal. per engine per month or 6,582 hp.-hours per gallon.

The thorough, careful reconditioning procedure, plus the cooperation and increased efficiency of the operating personnel, plus the adoption of mechanical improvements, which were devised by the mechanical personnel, has resulted in the Ajax system operating with a minimum of mechanical trouble. Nonpumping or "down time" affecting maximum possible throughput was reduced from 6 per cent in 1942 to 0.2 per cent in 1945 when throughput averaged almost 85,000 bbl. per day. The engines and pumps are in as good mechanical condition today as when originally installed, even though they have all been in continuous operation since 1942, except for the time they were down for yearly overhauls. Also operating without a permanent standby or spare unit has kept operators and mechanics "on their toes" to see that all units are in first-class condition at all times. It is felt, therefore, that operating without permanent standby units is practical and that such units may not be economically justified.

BOOKS

DISTILLATION AND RECTIFICATION. By Dr. Emil Kirschbaum. Published by Chemical Publishing Co., Brooklyn. 426 pp. $10.

This book will aid the practicing engineer as well as the student because it presents the results of research together with engineering data in the field of distillation and rectification. The treatment is strictly scientific. Structural details of apparatus and other factors important to an engineer have also been considered. Instead of specific industries, principles and generally suitable designs have been stressed and the numerical and descriptive examples have been referred to the specialized industries. As far as possible, graphical methods have been used in preference to methods requiring involved calculations. The tables and graphs will be very helpful to those engaged in the petroleum, gas, alcohol, solvents, rubber, drug, and other industries.

RESEARCH IN VENTING DIRECT GAS HEATERS WHEN NO CHIMNEY CONNECTIONS ARE AVAILABLE. By C. E. Blome and J. L. Bray, of Purdue University. Published by American Gas Association, 420 Lexington Avenue, New York, 68 pp. $1.

The A.G.A. is sponsoring a general study of gas-appliance venting practices in an effort to improve practices throughout the country. This bulletin reports the initial investigation of Purdue Research Foundation on a project sponsored by the A.G.A. Committee on Domestic Gas Research. Material was collected in various parts of the country and illustrates conditions that exist in both manufactured and natural-gas areas. It analyzes and appraises the venting problem and discusses many illustrated examples with the object of pointing out installations sometimes fail and what can be done to overcome these conditions.

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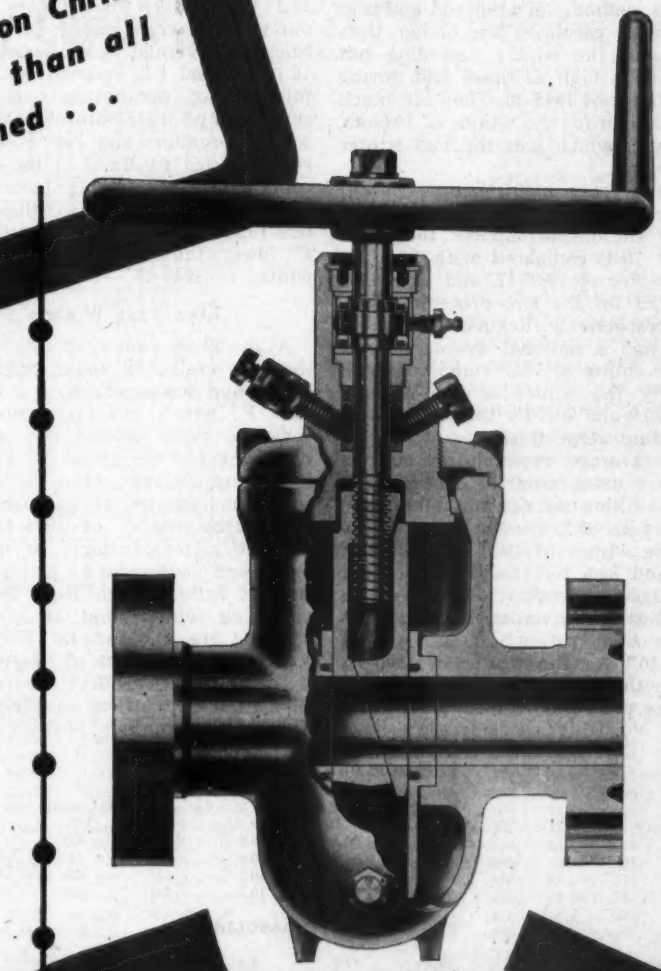

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B. of M. Report Shows Trend To Higher Octane Continuing

by O. C. Blade

THIS summary is from the author's Bureau of Mines report, R.I. 4354, "National Motor-Gasoline Survey, Winter 1947-48." This survey, made in cooperation between the American Petroleum Institute and the Bureau of Mines, is a continuation of a series of semiannual reports made for winter and summer seasons since 1935.

Data for the 17 marketing districts of the country in total represents 3,554 samples of motor gasoline. The samples were tested in the laboratories of 21 oil and motor companies who collected them from filling stations in 216 cities and towns throughout the country. The gasolines are the products of approximately 140 major and minor motor-fuel marketers.

R.I. 4354 includes charts for both winter and summer seasons which show the trends of octane numbers, Reid vapor pressure, and certain distillation points of the two grades of gasoline for the entire series of the cooperative surveys.

RESULTS of the Bureau of Mines national motor-gasoline survey for the winter 1947-48 indicate that the octane numbers (motor and research methods) of premium and regular-price gasolines are higher than those for the winter preceding but are not as high as those sold during the winter of 1945-46. They are much higher than for the winter of 1944-45, however, which was the last winter of the war.

The average motor octane ratings of premium-price motor fuels sold at filling stations throughout the country is 79.4, compared with 78.5 for the winter of 1946-47, and with 80.9 and 75.1 for the two preceding winters, respectively. Regular-price gasolines had a national average motor octane rating of 75.3, compared with 75.0 for the winter of 1946-47, and with 75.9 and 70.2 for the two winters preceding, respectively.

The average research octane ratings of premium-price motor fuels sold at filling stations throughout the country is 86.2, compared with 85.0 for the winter of 1946-47, and with 87.7 and 80.5 for the two preceding winters, respectively. Regular-price gasolines had a national average research octane rating of 80.2, compared with 80.1 for the winter of 1946-47, and with 81.7 and 74.2 for the two winters preceding, respectively.

The volatility characteristics have changed, also, but only slightly since the war. Reid vapor pressure for premium-price gasolines was 10.2 lb. for the past winter, compared with 10.1, 10.0, and 9.0 for the three previous winters, while regular-price gasolines had average vapor pressures of 10.1, 9.8, and 9.2, respectively. Compilations of distillation data show that average temperatures of 124° F. for the premium and 126° F. for the regular-price gasolines at the 10 per cent evaporated points have made virtually no changes in the three winters following V-J Day, but are about 8° lower than the figures for the winter of 1944-45.

Like Past Winters

At the 50 per cent evaporated points the two grades of motor fuel have distillation temperatures of 218° and 229° F., which are very much the same as those of the two winters preceding but are about 20° and 15° lower, respectively, than the 50 per cent temperatures of gasolines sold during the winter of 1944-45. The distillation temperatures at the 90 per cent evaporated points also showed little change from the two preceding winters but at 327° and 335° F., are 21° and 13° lower respectively, than those of 1944-45.

These figures reflect the abrupt changes from wartime gasoline quality and the trend in postwar motor fuels. Below are shown a table of average values and a chart which illustrates the comparisons.

In addition, compilations of tests on six other properties of motor gasolines were made. The national average values are: Gravity, 62.4° A.P.I. for premium-price and 62.1° A.P.I. for regular-price gasolines. Corrosion, negative for all samples tested. Sulfur content, 0.073 per cent for premium and 0.091 for regular-price motor fuels. Gum test results, 2.2 mg. per 100 ml. for premium and 1.9 mg. per 100 ml. for regular-grade gasolines. Tetraethyl lead contents, 1.85 ml. per gal. and 1.33 ml. per gal. for the two grades, respectively.

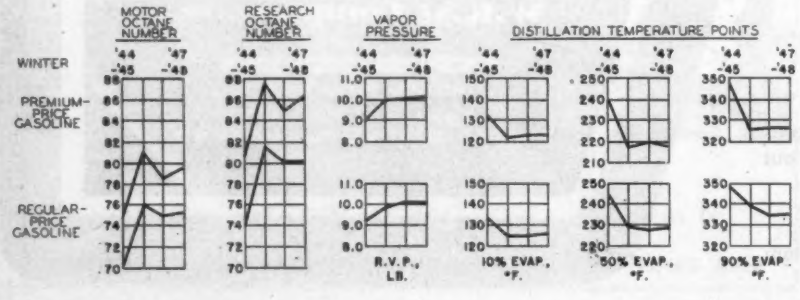
The new arrangement of marketing districts used in the preceding report has been continued. This arrangement of districts was developed by the C.F.R. Committee and now comprises 17 districts which have been selected with reference to the specifications on motor gasolines, refinery locations, population centers, and arteries of commerce such as navigable rivers. Characteristics of regular and premium-price motor gasolines are reported, based upon data contributed through the A.P.I. for compilation by the Bureau of Mines.

PREMIUM-PRICE GASOLINE

Winter—	Motor Oct. No.	Research Oct. No.	R.v.p. (lb.)	10% evap. (°F.)	50% evap. (°F.)	90% evap. (°F.)
1944-45	75.1	80.5	9.0	132	241	348
1945-46	80.9	87.7	10.0	123	218	326
1946-47	78.5	85.0	10.1	124	220	327
1947-48	79.4	86.2	10.2	124	218	327

REGULAR-PRICE GASOLINE

1944-45	70.2	74.2	9.2	133	245	348
1945-46	75.9	81.7	9.8	125	229	338
1946-47	75.0	80.1	10.1	125	227	334
1947-48	75.3	80.2	10.1	126	229	335



Surveys Since 1943

Blade, O. C., National Motor-Gasoline Survey: Winter 1943-44, R.I. 3758, May 1944. Summer 1944, R.I. 3796, January 1945. Winter 1944-45, R.I. 3820, June 1945. Summer 1945, R.I. 3883, January 1946.

Blade, O. C., and Sponsler, C. R., National Motor-Gasoline Survey, Winter 1945-46, R.I. 3959, July 1946.

Blade, O. C., National Motor-Gasoline Survey: Summer 1946, R.I. 4063, December 1946. Winter 1946-47, R.I. 4146, August 1947. Summer 1947, R.I. 4248, January 1948.

Published in cooperation with the American Petroleum Institute: Blade, O. C., National Motor-Gasoline Survey, Winter 1947-48, this report.

ENGINEERING fundamentals

Use of Production Data to Construct Relative Permeability Curves

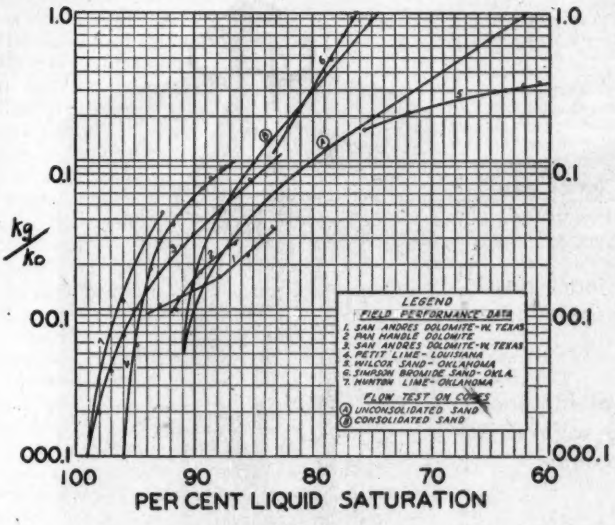


Fig. 1

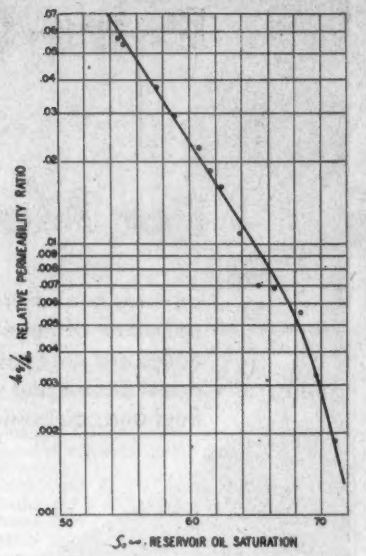


Fig. 2

THE production data obtained in operating a reservoir can be used to calculate curves giving the relative permeability ratio as a function of the oil saturation of the reservoir rock. Such curves, constructed from operating data alone, reflect not only the flow characteristics of the reservoir fluid through the particular reservoir rock but also the operating practices imposed on the reservoir.

Two separate equations are used to calculate k_g/k_o and oil saturation, S_o, at a particular time in a reservoir's history. These equations are:

$$\frac{k_g}{k_o} = (R - r)\frac{\mu_g}{\mu_o}\frac{v}{\beta} \quad (1)$$

and

$$S_o = (1 - S_w)\left(1 - \frac{\Delta N}{N}\right)\frac{\beta}{\beta_o} \quad (2)$$

(These equations were discussed in Engineering Fundamentals Nos. 340 and 337 respectively.)

The equations involve only the pressure measured at the given time, the cumulative production measured at the given time, and the producing gas-oil ratio at the given time. The water saturation is assumed to be a given, constant value.

Calculations of k_g/k_o and S_o made at a number of times in a reservoir's history can be plotted to give the expected relationship on semilog paper. A number of such curves, calculated from observed data, are available in the literature.[1,2] One such group of calculations is duplicated here as Fig. 1.

To illustrate the actual calculation, the above equations are applied to data taken from a literature source.[3] The same source gives N for this reservoir as 116.5×10^6 bbl., S_w as 28.5 per cent, and β_o as 1.45. Tabulation of the data showing the steps in calculation follow. Results are plotted in Fig. 2.

Average pressure	R	ΔN	ΔN/N	β	v	r	μ_o/μ_g	S_o	k_g/k_o
3,448	850	$.476 \times 10^6$	.0041	1.443	.000840	752	30.4	.710	.00187
3,303	920	1.743×10^6	.0150	1.432	.000875	725	32.1	.696	.00321
3,153	990	2.818×10^6	.0242	1.420	.000910	695	34.0	.684	.00556
2,938	1,020	4.652×10^6	.0399	1.403	.000970	657	36.8	.664	.00682
2,813	1,000	6.030×10^6	.0517	1.393	.001010	632	38.4	.652	.00694
2,678	1,180	7.360×10^6	.0632	1.382	.001062	608	40.5	.638	.01085
2,533	1,420	8.751×10^6	.0752	1.371	.001122	580	42.4	.625	.01620
2,453	1,510	9.873×10^6	.0847	1.364	.001162	565	43.6	.615	.01848
2,318	1,660	11.259×10^6	.0965	1.354	.001230	540	45.5	.609	.0224
2,153	1,920	12.619×10^6	.1083	1.340	.001330	509	48.0	.589	.0292
1,978	2,220	13.998×10^6	.1202	1.326	.001453	476	50.8	.575	.0377
1,818	2,480	15.321×10^6	.1318	1.313	.001590	446	53.8	.563	.0456
1,658	2,710	16.552×10^6	.1420	1.301	.001758	416	57.4	.550	.0540
1,625	2,800	16.929×10^6	.1453	1.298	.001795	410	58.2	.546	.0567

References

1. The Importance of Injected Gas As a Driving Medium in Limestone Reservoirs As Indicated by Recent Gas Injection Experiments and Reservoir Performance History; L. E. Elkins, A.P.I. Drilling and Production Practice, 1946, p. 160.
2. Evaluation of Pressure Maintenance by Internal Gas Injection in Volumetrically Controlled Reservoirs; Patton, A.I.M.E. Trans. 1947 (Vol. 170) Fig. 6.
3. Engineering Features of the Schuler Field and Unit Operation; H. H. Kaveler, A.I.M.E. Trans. (Vol. 155) 1944.

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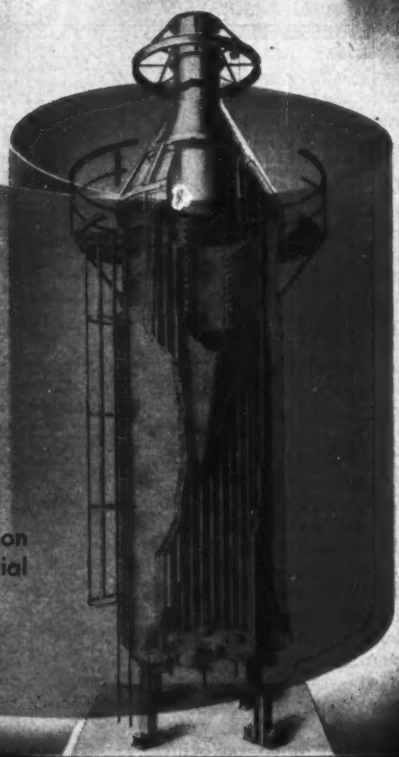

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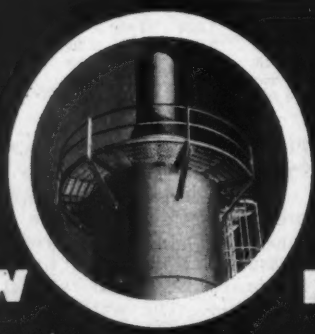

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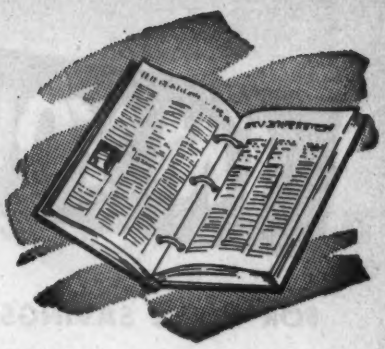
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Tower Pressure Drops

SCARCELY any information is available concerning the pressure drop that occurs in fractionating towers although many theoretical formulations have appeared. The theoretical derivations are in conflict with one another. Most striking is the fact that theory indicates that pressure drop is a square function of the vapor velocity whereas experimental data indicate a more nearly linear relationship between velocity and pressure drop.

Table 1 shows the results of a scant amount of experimental data on commercial trays and some data on the new Koch Kascade tray. Liquid flow (gallons per hour per square foot of tower area including downcomers, waste space, etc.) has a pronounced effect on the pressure drop, particularly at high vapor velocities. Generally, an increase in vapor density (pounds per cubic foot at tower conditions) causes the pressure drop to be smaller, except at very low liquid rates where the pressure drop first decreases and then tends to increase slightly as the density is increased. Each tray design exhibits different pressure-drop characteristics and hence Table 1 can be considered as a generalization.

The inches of water pressure drop shown in Table 1 can be converted to inches of oil by dividing by about 0.68 (the specific gravity of the liquid on the trays of an atmospheric pressure tower). In addition, the downcomer liquid is a froth which by several sets of experimental data appears to be about half vapor and half liquid. Thus, the figures shown in Table 1, if multiplied by about 3, are the approximate height of the liquid standing in the downcomer. For a 24-in. tray spacing the pressure drop cannot exceed about 24 ÷ 3 or 8 in. of water. The maximum pressure drops per tray for different tray spacings are somewhat as follows:

Spacing (in.)	Water (in.)	Psi.
18	6	0.216
24	8	0.288
30	10	0.36

TENTATIVE SCHEDULE OF TOPICS

The following subjects have been or are being discussed in current Refiner's Notebooks:

No. 204—July 8—Retiring Thickness—12 and 20-in. pipe
No. 205—July 15—Retiring Thickness—14 and 24-in. pipe
No. 206—July 22—Friction Factors
No. 207—July 29—Pressure Drops—150° F.
No. 208—Aug. 5—Pressure Drops—60° F.
No. 209—Aug. 12—Pressure Drops—300° F.
No. 210—Aug. 19—Tower Pressure Drops
No. 211—Aug. 26—Velocity Head
No. 212—Sept. 2—A.C. Motor Trouble
No. 213—Sept. 9—Cost of One Brake Horsepower
No. 214—Sept. 16—Handling Ammonia

TABLE 1—APPROXIMATE PRESSURE DROP PER PLATE—INCHES WATER

	Vapor density, lb. per cu. ft.						
	0.2	0.4	0.6	0.8	1.0	1.2	1.4
Slot vel. of 4 ft. per sec.:							
100 g.p.h. per sq. ft.	2.4	2.1	2.0	2.0	2.0	2.1	2.1
300	3.1	2.6	2.4	2.4	2.3	2.3	2.4
600	4.2	3.4	3.1	2.9	2.8	2.8	2.8
900	5.3	4.2	3.7	3.5	3.3	3.2	3.2
1,200	6.4	5.0	4.3	4.0	3.8	3.7	3.7
1,500	7.9	5.8	5.0	4.6	4.3	4.2	4.1
1,800	...	6.6	5.6	5.2	4.9	4.6	4.5
Slot vel. of 8 ft. per sec.:							
100 g.p.h. per sq. ft.	2.5	2.5	2.7	2.9	3.0	3.2	3.4
300	4.7	4.0	4.0	3.9	3.9	4.0	4.2
600	9.5	7.0	6.2	6.0	5.8	5.6	5.7
900	16.7	12.5	10.6	9.8	9.2	8.8	8.7
1,200	...	16.6	13.8	12.6	11.7	11.0	10.7
1,500	...	...	17.0	15.4	13.2	13.2	12.8
1,800	...	...	...	18.2	16.7	15.4	14.9
Slot vel. of 12 ft. per sec.:							
100 g.p.h. per sq. ft.	3.5	3.6	3.8	4.2	4.4	4.7	5.1
300	9.6	7.9	7.3	7.2	7.1	7.2	7.4
600	18.8	14.5	12.7	12.0	11.3	10.9	11.0
900	28.0	20.9	17.9	16.7	15.4	14.8	14.3
1,200	...	...	23.2	21.3	19.6	18.6	17.9
1,500	...	...	...	...	23.7	22.3	21.4
Slot vel. of 16 ft. per sec.:							
100 g.p.h. per sq. ft.	5.4	5.3	5.6	5.9	6.2	6.5	6.9
300	14.1	11.4	10.9	10.2	10.1	10.0	10.2
600	...	20.8	19.0	16.8	15.9	15.2	15.0
900	...	...	...	23.3	21.7	20.5	19.8
1,200	...	...	...	...	...	25.7	24.6
Slot vel. of 20 ft. per sec.:							
100 g.p.h. per sq. ft.	8.1	6.8	7.2	7.5	8.0	8.4	8.8
300	19.4	14.5	13.6	13.0	12.9	12.9	13.0
600	...	...	23.2	21.5	20.5	19.8	19.2
900	...	...	...	...	...	26.8	25.4

No. 210 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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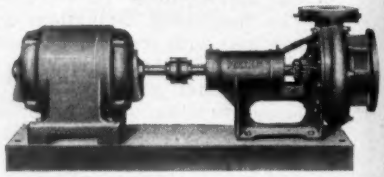

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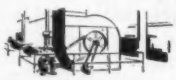

SYSTEM SUBASSEMBLIES

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CAPACITIES: *10 to 50 GPM*
HEADS: *20 to 95 ft.*

BUILDINGS

FOOD PACKERS

Possessing all characteristics of the Types PE and PB pumps described above, these fractional Fluidyne Peerless Pumps may be coupled to motor for incorporation into any system requiring forced liquid circulation. All Fluidyne pumps are of end suction, single stage design with vertical split casing joint, and embody a host of features for ease of accessibility and maintenance. *Completely described in Bulletin B-150 and B-151.*

Type PE Integral HP Electric Unit

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FOOD MACHINERY CORPORATION
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District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 No. Broadway; Atlanta Office: Rutland Building, Decatur, Georgia; Dallas 1, Texas; Fresno, California; Los Angeles 31, California

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

(1) KOEBELITE DIAMOND CORE BITS for coring in hard formations are available in all sizes and in two general styles: the brazed insert type and the mechanical-set insert. Illustrated is a standard brazed insert bit. Selected and tested diamonds are set in separate inserts in a powdered metal matrix in a field-proven pattern and firm-proven pattern and firmly brazed into position. Inserts in the mechanical-set bits may be replaced on the job in a matter of minutes. Any damaged portion of the bit can be removed and replaced before excess diamond loss occurs. The diamonds from the worn inserts can then be reset with no appreciable loss. Threaded body can be used over and over, only replacing the inserts as wear occurs, eliminating expensive setting charges. *Oil Base, Inc.*

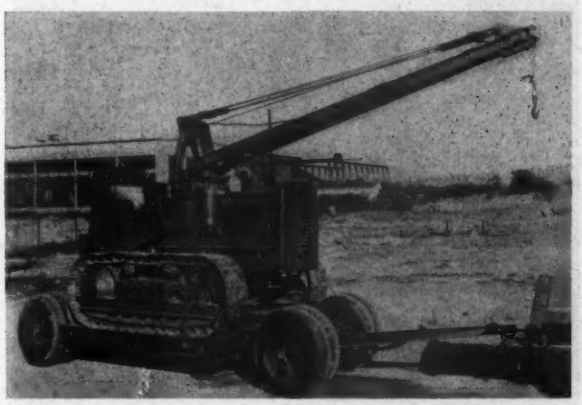
IT'S NEW CHECK IT

(2) CLEAR-SPAN BUILDING, 50 ft. wide, combines the permanency of conventional construction and all of the advantages of prefabrication in speed and economy of erection. Building is engineered to the highest A.I.S.C.

standards and designed to comply with local building codes. For expanding manufacturing facilities, for storage and warehouse space, for display rooms or recreational buildings, building offers many advantages. These buildings are readily adaptable for many industrial and commercial uses by being joined to modern architectural fronts of masonry construction. Economy and quick delivery of the building are achieved by modern mass-production facilities. Building can be purchased complete with roof and sidewalls of ribbed aluminum panels, or the structural framework, with or without roof panels, is available for use with any type of masonry construction. Building can be obtained in any length in multiples of 20 ft., the height to eaves is 14 ft. *Steelcraft Manufacturing Co.*

IT'S NEW CHECK IT

(3) EQUIPMENT-HAULING TRAILER is a flat-bed two-axle front-loading model for moving overhead shovels, tractors, cranes, trenchers, bull dozers, back fillers, machinery, pipe, steel, lumber, etc. Trailer requires no special type vehicle for the hauling. Extremely low-loading height (under 24 in.) minimizes all bridge and overhead



wire problems and enables the user to keep within all federal and a majority of state road laws. Sturdy, quality construction, even weight distribution, generous-size tires, and four-wheel electric brakes assure safety and speed on the road. Front loading and unloading is accomplished with a maximum of speed and safety through the unique yet simple design of the trailer front. Two adjustable feet (one on each front corner) controlled by a built-in easily accessible hand-operated hydraulic jack, in front center, permit easy removal and replacement of

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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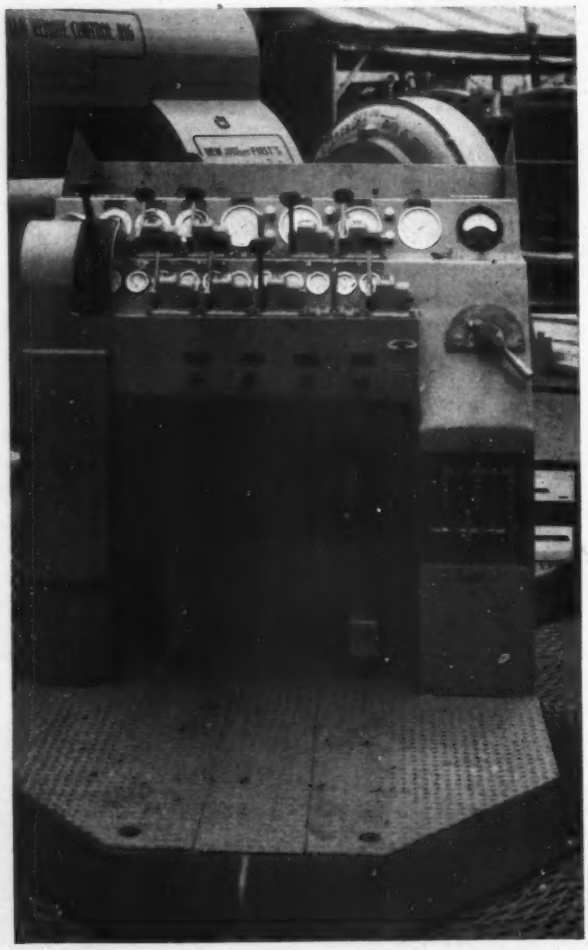
the front axle and tongue. This assembly gives a four-point support that minimizes the loading angle and reduces the hazards of tipping and slipping. *Cleveland Trencher Co.*

IT'S NEW CHECK IT

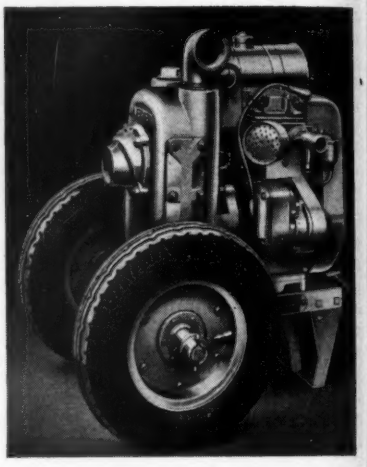
(4) NEW POWER RIG combines speed in setting up and going into action with revolutionary remote control features. Rig features one unit, consisting of draw works, transmission, compounding drives, pump drives, and engines, designed to be set up at truck bed or ground level while a second unit, composed of the rotary table into which has been incorporated the cathead shaft, is



mounted on the derrick-floor level. This is the first rotary-table unit with built-in cathead. Through this arrangement, conductor string pipe can be set and cemented and rathole dug before the draw works is rigged up. Catheads are operated with air-tube disk clutches that do not require adjustments. Spinning-line cathead can be set to tighten all joints to the same degree of tightness. Driller can operate rig by punch-button remote control. Entire crew is as near as the microphone at the driller's elbow and the public-address amplifier can be rigged up at any convenient location on the well. Remote-control console is completely air actuated with air throttles on all engines, air controls to all friction clutches, and automatic speed change operated by air for the transmission of the draw works. Catheads and friction clutch on rotary drive unit are also air operated. Rotary-table drive unit is unique in that the engine has been turned around so that the radiator faces the rotary table. By doing this, a standard rotation engine can be used to drive the rotary table in the right direction without gears. A drive shaft under the engine then carries the power back to a forward and reverse-speed box with a friction clutch between this box and the rotary table. A power takeoff in the upper part of this box drives the cathead shaft, mounted above this box, by means of a chain drive and bevel-gear drive. *Wilson Manufacturing Co.*

IT'S NEW CHECK IT

(5) PORTABLE HIGH - PRESSURE PUMP answers the demand for a compact, completely self-contained and easily transported pumping unit that will take water from surface supply sources and deliver it at pressures adequate for fire protection and similar applications. Pump is a 2-in., gasoline - engine-driven unit weighing only 150 lb. including pneumatic tires, mounting frame, and telescoping towing pole. At 10-ft. suction lift, pump has a range of volumes and pressures from 135 g.p.m at 10 lb. discharge pressure, to 30 g.p.m. at 60 lb. discharge pressure, and a maximum shutoff pressure at 70 lb. *Jaeger Machine Co.*



IT'S NEW CHECK IT

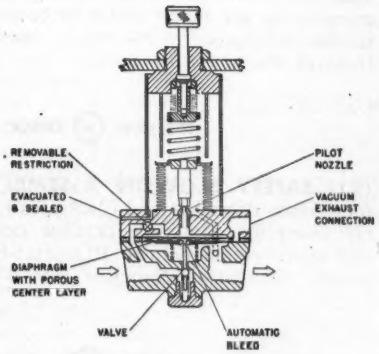
(6) QUICK-OPENING SAFETY DOOR is for use on a pressure or vacuum vessel, vertical or horizontal. Safety door differs from conventional pressure-vessel doors in

that the sealing mechanism is a free-moving, rotating, indexing ring mounted on bearings. It requires no special tools, gears, or hand wrenches, and has no threaded parts. A simple two-step operation is all that is required

to open the door. A breaker bar inserted in a leverage slot on the indexing ring turns the indexing ring enough to crack the door and dissipate any remaining pressure or water. In this position the door is still engaged. One further movement of the indexing ring permits the door to swing free. Entire operation takes approximately 4 seconds. Closing takes only 2 seconds, the indexing ring being turned to a locked position in one movement. *United Welding & Manufacturing Co.*

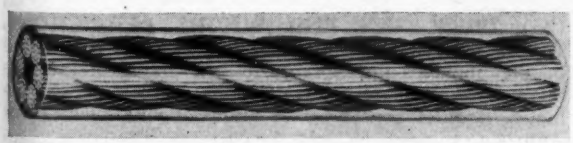
IT'S NEW CHECK IT

(7) VACUUM PRESSURE REGULATORS for subatmospheric applications, include models with barometric compensation for regulating at absolute values. Instruments are designed to hold set values constant, regardless of changes in flow as well as variations in the supply pressure. Regulators may better be described as pressure controllers, since they use the pneumatic "null" balance system in which the main valve is operated by a pilot nozzle. This nozzle operates with a constant differential pressure which holds the nozzle seat at essentially the same position for each set value. Two models have an automatic bleed which makes them suitable for use on dead-end service as well as on flow and reverse-flow service. Model illustrated, suitable for regulating absolute pressures, has an evacuated chamber. Other model is not compensated for barometric pressures. Regulated pressure range of these instruments is 1 to 20 psia. when used on dead-end service, or approximately 0 to 20 psia. when used on continuous flow service of 0.02 cu. ft. per minute standard basis or more. Two other models are furnished for use on continuous flow applications only, and do not have the automatic bleed. *Moore Products Co.*



IT'S NEW CHECK IT

(8) WIRELON is a nylon-coated wire rope that lengthens the life and increases the usefulness of steel cables in many services where wire rope is already used. Although chemically similar to the nylon used in women's hose, the coating is not woven or filamented, but solid.



The Du Pont nylon coating is unaffected by oils, cleansing agents, marine growths, and all alkalies. It is not harmed by such acids as nitric, hydrochloric, or sulfuric in concentrations up to approximately 1 per cent. Temperature tests show that Wirelon ropes operate well at high and low temperatures. The ropes retain their flexibility wet or dry. Wirelon is available in diameters ranging from 1/32 to 1 in. or greater. *Rochester Ropes, Inc.*

IT'S NEW CHECK IT

OIL AND GAS EQUIPMENT Digest

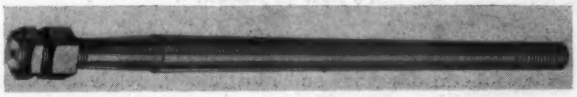
IT'S NEW CHECK IT

(9) NEW FIRE TRUCK for oil industry is a one-man operated, foam-producing, fire-fighting, double-duty truck for protection of oil risks. To fight a fire in an 80,000-bbl. tank, using two large-capacity duplex generators, would require eight men. To extinguish such a

fire in a reasonable time would require 11,500 lb. of dry powder—a huge bulk which would have to be transported to the threatened area. The new truck will produce sufficient foam immediately at the scene of action. Truck is engineered for its specific purpose and can be designed in any capacity from 2,500 g.p.m. of foam to 12,000 g.p.m. Each truck also serves as a regular water pumper, in addition to its foam-producing equipment. *National Foam System, Inc.*

IT'S NEW CHECK IT

(10) SURFACE-HARDENED PISTON RODS for slush pumps are made by induction-hardening process. Operation permits uniform surface hardening to 700 Brinell,



with retention of the original core ductility. Localized heating and hardening minimizes distortion, eliminating the necessity for straightening and heavy grinding into the hardened surface. Induction-heating equipment consists of an inductor, quenching auxiliaries, suitable transformer metering devices, automatic timing controls, and a source of high-frequency power. Parts treated by this process are uniform and metallurgically exact. *Falcon Products, Inc.*

IT'S NEW CHECK IT

TRADE LITERATURE

(11) HISTORICAL REPRODUCTION. Reproduction of a full-colored painting of an ancient Chinese drilling rig is printed on heavy 17 by 22-in. stock suitable for framing. It contains no advertising. *Baroid Sales Division, National Lead Co.*

IT'S NEW CHECK IT

(12) SAFETY EQUIPMENT. New 64-page catalog not only lists the company's products but also tells where to use, how to use, how to maintain, and how to select

industrial protective equipment. Catalog is a guide to accident prevention. Illustrated. *Chicago Eye Shield Co.*

IT'S NEW CHECK IT

(13) OIL-FIELD ENGINES. New fold-out bulletin describes and illustrates manufacturer's unit-construction industrial engines. Specifications diagram included. *Hall-Scott Motor Division, ACF-Brill Motors Co.*

IT'S NEW CHECK IT

(14) OIL-FIELD ROTARIES. New 12-page booklet describes design features of manufacturer's rotaries for all drilling applications. Cutaway and outline drawings included. Two color. *Oil Well Supply Co.*

IT'S NEW CHECK IT

(15) UNDERGROUND PIPE WRAP. A new folder punched for ring binding describes and illustrates Vitron glass-fiber underground pipe wrap. Application of pipe wrap is covered by descriptive drawings. *M. J. Crose Mfg. Co., Inc.*

IT'S NEW CHECK IT

(16) SYNCROGEAR MOTORS. The use of geared motor power in driving machinery and the presentation of latest electrical motor models are dramatically shown in the multicolored 16-page bulletin. Advantages of using hardened gears and pinions to obtain greatest wear resistance and methods of obtaining hardness are described. *U. S. Electric Motors, Inc.*

IT'S NEW CHECK IT

(17) DEAERATING FEEDWATER HEATER. An eight-page bulletin describes and illustrates a newly designed spray-tray deaerating feedwater heater. Distinctive feature of the design is the elimination of the customary vent condenser. *Elliot Co.*

IT'S NEW CHECK IT

(18) GLASS BUBBLE-PLATE COLUMNS. New folder describes four standard sizes of fractionating bubble-plate columns for laboratory and pilot-plant uses. Contains tabular presentation of maximum throughput, operating plate efficiency, maximum operating temperature, operating holdup, residual holdup, pressure drop, minimum operating temperature, heat loss, column length, holes per plate, and other physical factors. *Glass Engineering Laboratories.*

IT'S NEW CHECK IT

(19) LUBRICATED PLUG VALVES. New eight-page, three-color bulletin describes and illustrates full-pipe-area lubricated plug valves in steel, semisteel, bronze, and other metals. Valves may be used for controlling flow of acids, caustics, chemicals, oil, water and other fluids. *American Car & Foundry Co.*

IT'S NEW CHECK IT

(20) CORROSIVE-FLUID CONSTRUCTION GUIDE. A four-page engineering bulletin gives detailed recommendations on construction materials for almost 400 different corrosive liquids and gases. Material recommendations are listed under three headings having particular reference to Flowrator instrument construction features. *Fischer & Porter Co.*

IT'S NEW CHECK IT

(21) SAFETY BLOWOFF ASSEMBLY. New folder in four colors describes and illustrates manufacturer's blow-off assembly. Material includes description, operation, and specification details. Blueprint-type diagram shows typical installation. *Superior Iron Works & Supply Co., Inc.*

IT'S NEW CHECK IT

(22) DIRECT-FIRED EMULSION HEATER. A four-page bulletin describes cast-iron direct-fired emulsion heater with high corrosion resistance to sour crude oils. Dimensional and operating data included. Illustrated. *National Radiator Co.*

IT'S NEW CHECK IT

(23) CROWN AND TRAVELING BLOCKS. An eight-page, two-color bulletin describes and illustrates six or seven-sheave crown blocks and five or six-sheave traveling blocks or 350-ton capacity for high-speed deep-well drilling. *L.F.M. Co.*

IT'S NEW CHECK IT

(24) INDUSTRIAL CHEMICALS. A 32-page booklet lists all manufacturer's chemicals, briefly relates the history of the organization, and describes company's major objectives. Illustrated. *Harshaw Chemical Co.*

IT'S NEW CHECK IT

(25) TRUCK SIZE AND WEIGHT RESTRICTIONS. The 1948 truck and trailer size and weight-restrictions booklet includes the most up-to-date listing of laws affecting size and weight restrictions for commercial vehicles. Booklet covers all 48 states. *Four Wheel Drive Auto Co.*

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REFINING

Refinery-Wage Survey Is Planned by Labor Bureau

The Bureau of Labor Statistics will make a wage survey of the refining industry this fall, carrying into effect a plan which has been under discussion for the past several years.

The survey will supplement a manpower survey of the entire petroleum industry which was ordered by the National Petroleum Council at its July meeting on a request by Max W. Ball, director of the Oil and Gas Division, although the only connection between the two is that of coincidence.

The bureau's study will be directed by Harry Ober, chief of the industry wage studies branch, who already has visited the Union Oil Co.'s refinery at Wilmington, Calif., and the Socony-Vacuum Oil Co., Inc., plant at Paulsboro, N. J.

It is the intention of the bureau to confine its studies to the larger refineries, but under the standard setup to separate large and small refineries (50 employes) not many plants will be excluded.

The survey will cover approximately 40 key occupations rather than all occupations found in the industry.

Group Makes Inspection Tour of Sugar Creek Unit

The new fluid catalytic cracking unit at the Sugar Creek refinery of Standard Oil Co. (Ind.) was opened last week for an inspection tour by civic leaders and representatives of the press in the Kansas City area. A. W. Peake, president of the company, and principal speaker at the gathering, called the new Sugar Creek unit typical of the equipment in the petroleum industry which makes possible good returns to stockholders and helps to make possible reasonable prices for petroleum products.

Construction of the unit, which has a capacity of 25,000 bbl. daily of fresh feed, was begun in January 1946 and went on stream last month.

Peake told the group that the new unit is one of four planned by Standard of Indiana as part of a $600,000,000 program of construction and expansion at many locations in various departments of the parent company and subsidiaries.

Other company officials attending the tour at the Sugar Creek plant included: Dr. M. G. Paulus, vice president in charge of manufacturing; H. F. Clair, general manager of manufacturing; R. F. McConnell, vice president in charge of sales; and J. K. Roberts, general manager of research. R. E. Beard is manager of the Sugar Creek refinery.

Co-Op Buys 115,000 Bbl. Of Middle East Crude

Consumers Cooperative Association has purchased 115,000 bbl. of Middle East crude oil from Anglo-Iranian Oil Co., Ltd. The cargo, which is scheduled for shipment about September 15, is the first Middle East crude oil ever purchased by a United States Cooperative, according to Howard A. Cowden, president and general manager of Consumers Co-Operative. A second shipment is scheduled for mid-November, Cowden said.

The oil will be processed in co-op refineries or exchanged with an eastern refiner for midwest crude. The tanker has already been chartered, Cowden said, and will probably be loaded at Abadan, Iran, or across the tip of the Persian Gulf at Al Kuwait.

"This importation of Middle East crude completes the chain of co-op international trade in petroleum which began with shipments of lubricating oils and greases to co-ops in Europe, Africa, and Australia first by C.C.A. and, after it was established in 1947, by International Cooperative Petroleum Association," Cowden explained.

Purchase of Lake Charles Chemical Plant Approved

Purchase of the ammonia plant at Lake Charles, La., by Mathieson Chemical Corp. for $7,063,300 has been approved by War Assets Administration. The anhydrous ammonia, manufactured by the plant will be used largely for the production of fertilizer materials.

The plant, which originally cost the Government $13,566,850, has been operated by the Mathieson company under lease since the war. The company will be credited with $1,665,400 for improvements made on the plant during the lease period. Sixteen buildings of permanent type construction are included on the approximate 14-acre site.

One of the conditions of the sale required the company to maintain the nitric acid oxidation and the ammonium nitrate solution equipment in

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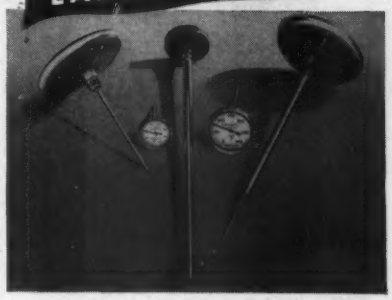

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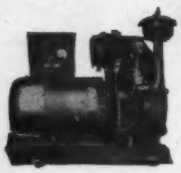
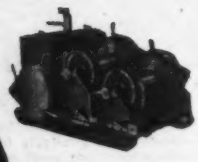
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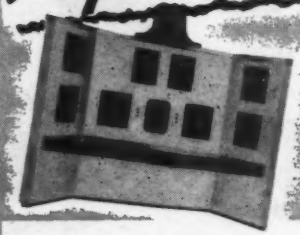
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Sinclair Completes New Research Laboratories

Sinclair Refining Co.'s multimillion dollar research and development laboratories on the 39-acre site on Sibley Boulevard at Harvey, Ill., have been completed. The new plant is 10 miles from the company's East Chicago refinery, where the company's research facilities were previously located.

The plant, consisting of nine main structures with 215,000 sq. ft. of floor space, includes an administration building, engine laboratory, lube treating compounding distillation building, fuel application laboratory, pilot plant building, shop, warehouse, and garage buildings, and a first-aid building.

Sinclair technicians are presently carrying out research on coal, gas, and oil shale as new sources of raw material for petroleum products.

Navigation District Drops Todd-Houston Site Claim

The Harris County-Houston Navigation district last week abandoned any plans for condemnation proceedings to acquire a portion of the Todd-Houston shipyard site, which the Phillips Petroleum Co. plans to purchase for its new $6,000,000 Houston chemical plant.

The ruling made last week was announced in a letter to the Phillips company signed by Commission Chairman Wilson G. Saville and stated that Phillips' plans "if carried out, will undoubtedly benefit this community more than the present plans we have for the use of this site."

Streamlined Distribution Methods Cited by Minor

Streamlined methods of distribution can save the oil industry from 33 to 50 per cent in the unit cost of warehousing, O. F. Minor, executive for Shell Oil Co., Inc., told the Georgia Independent Oilmen's Association recently in Macon, Ga.

Pumphouses, now standard equipment in most depots, will probably be made obsolete by all-weather motors and pumps that operate out of doors. Tank trucks, in the future, may be filled through hoses in the side, thus eliminating present elaborate loading racks, Minor said. Except in very cold climates, costly garages for trucks will be replaced by tiny electrical warm-up devices that take over the garage's only vital function—making cold weather starting easier. Because of new hydraulic lifting devises warehouses will be built smaller and at ground level, he explained.

For effective control of distribution, there is also need for accounting systems that show the costs of operations in complete detail. The oil industry's greatest economies of the future, Minor concluded, will come through these new scientific improvements in distribution methods.

Instrumentation Course Scheduled at Texas A. & M.

The subject of automatic control will feature the third short course on "Instrumentation for the Process Industries," at Texas A. & M. College, College Station, Tex., October 26-28. Manufacturers of instruments and automatic controls will show educational exhibits and provide lecturers for many of the sessions on the program.

The course will be conducted as a seminar with lectures and discussions. Rooming accommodations and meals will be available on the campus. Registration fee is $5.

Canadian Output Up

OTTAWA.—Canadian output of refined petroleum products in April was 5,840,000 bbl. as compared to 4,993,000 bbl. for the same month last year. The total for the first 4 months of 1948 was 21,949,000 bbl. compared with 19,895,000 bbl. for the same period of 1947.

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PIPE LINES

Creole's Big Inch Line Is Nearing Midpoint

CREOLE PETROLEUM CORP. is progressing with construction toward a midpoint at Debajuro in the construction of its 155-mile, 24-26-in. Ule tank farm-Amuay Bay crude-oil line. The project started May 1, 1947, under contract by Williams Brothers Co.

Pumping of oil is scheduled to begin December 1, 1948. At first the company expects to move at the rate of 200,000 bbl. daily. After this line and associated projects are completed the line will be operated at its full capacity of 300,000 to 325,000 bbl. daily. Part of the shipments will go to the Creole 60,000-bbl. refinery at Amuay Bay on the Paraguana Peninsula; the remainder will be shipped from storage tanks to ocean tankers bound for the world's markets.

At present operations are being carried on along the shore of Golfeto de Coro to prepare sections of pipe which are to be pulled seaward for the construction of the submarine crossing in an area of shallow water with choppy seas.

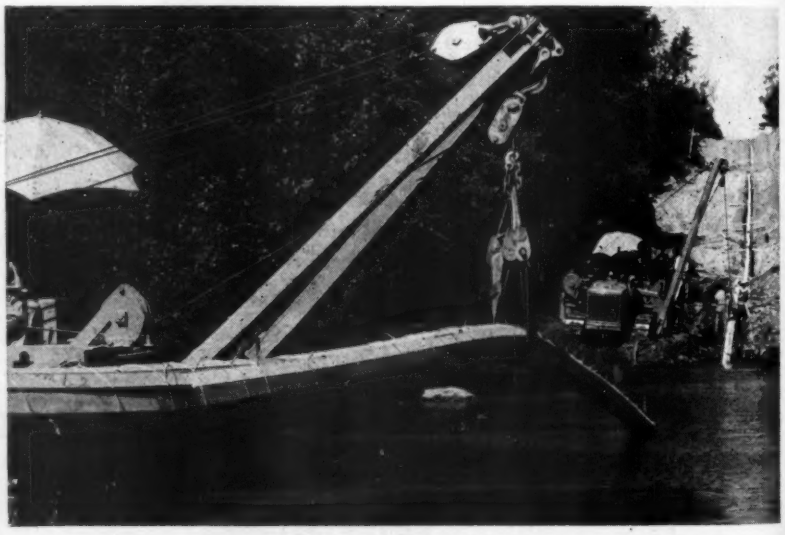
Supplying materials to the central zone of the project near Debajuro proved difficult since 32,000 tons of pipe and materials had to be loaded on barges at Amuay and transshipped to be unloaded on the beach on the coast of the Gulf of Venezuela north of Debajuro.

Transportation of materials has been hampered by a lack of all-weather roads along the route. However, the country is fairly level with the highest point only about 400 ft. above sea level. The ground is covered with vegetation, some of it of a heavy tropical nature.

The line crosses 15 rivers, all subject to flash floods. River crossings are made on trestle-like bridges made of heavy pipe filled with concrete on which the pipe is supported.

The 600-ft. wide Zazarida River channel will be crossed by laying the pipe below the river bottom. The pipe will be double-coated and wrapped and then encased in a concrete-filled trench 6 ft. below the river bottom. Elsewhere, the majority of its sections rest on the ground. Wherever it traverses marshy land or where it is buried underground, the pipe is given extra coating of protective material.

At the submarine crossing, pipe with a ½-in. wall with special protective coating will be used for burying 3 ft. below the bottom of the gulf. Maximum depth of the gulf water is approximately 20 ft. All pipe is furnished by National Tube Co. Wall thickness varies from ⅜-in. to



Section of Socony-Vacuum Oil Co., Inc., Portland-Bangor, Me., 127-mile, 6 and 4-in. products pipe line being lowered into a ditch in the bottom of a stream near Bangor. Wooden slats cover the pipe protecting its corrosion-resistant coating during handling. It is the first line in Maine for the delivery of finished petroleum products

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½-in., according to the terrain and proximity to pump stations.

The Ule station is a concrete and steel building 90 meters long and 24 meters wide housing seven Worthington horizontal triplex double-acting reciprocating pumps driven by seven 940 hp. Cooper-Bessemer eight-cylinder gas-diesel engines. Each is capable of pumping 50,000 bbl. per day at approximately 900 psi.

Debajuro's installations are to be similar to those at Ule. Both stations will have their own electric power generation. The Ule plant will produce 350 kw. while the Debajuro plant will turn out 700 kw. Office buildings, employe housing, recreational facilities, and commissaries are planned for both stations.

The established Creole tank farm at Ule has been expanded with the construction of eight new 150 by 48-ft. floating-roof type steel storage tanks, each with a capacity of 150,000 bbl. At Debajuro, three 120 by 48-ft. cone roof steel tanks are being erected, each capable of holding 96,000 bbl.

Sixteen tanks with a total capacity of 2,400,000 bbl. have been completed at Amuay terminal, where the incoming oil will be destined either for the refinery or for prompt export by tanker. Creole's available tankage space will thus be increased by 3,888,000 bbl. when the pipe-line project is completed. Creole (and partners) at present has tankage capacity of 14,711,860 bbl.

Progress Report on 26-in. Cities Service Line Issued

Cities Service Gas Co. had completed 96 miles of the 26-in. line under construction from Ulysses, Kans., to Kansas City, according to reports late last week.

Ray L. Smith & Son, Inc., had laid 46 miles of main line at the western end through August 13. On August 12, the record for the day was as follows: ditched 10,700 ft.; firing line 9,700 ft.; primed and painted 12,800 ft.; laid 10,600 ft.; backfilled and cleanup 10,000 ft. Work on the main line was begun July 11 by the Ray L. Smith organization. The entire contract is for laying 183 miles from Ulysses to Hutchinson, Kans. Chief inspector for Cities Service on this section is M. O. Thomas. Contractor's operations are directed by Joe Work, general superintendent, and William Frost, spread superintendent, Ray L. Smith & Son, Inc.

Midwestern Constructors, Inc., completed 49.5 miles of 26-in. for the section at the northern end on August 10, supervised by M. T. Wilhite, superintendent.

To complete the 405-mile line from Ulysses to Kansas City, 172 miles of 26-in. from Hutchinson to Ottawa will be laid next year.

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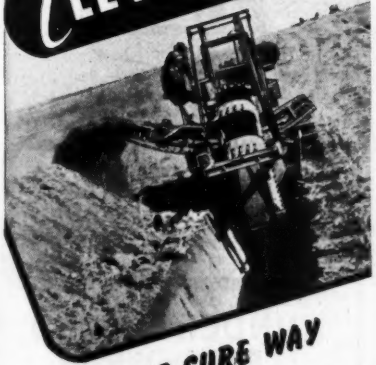

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Sinclair Products Line Hits New High

Sinclair Refining Co. reports a new high of 88,100 bbl. of products delivered through its eastern division products line on August 10. This compares with a previous daily high of 85,200 bbl. on April 12.

In the first 6 months of 1948 the products line, which extends from the company's Marcus Hook refinery to its refinery at East Chicago, delivered 8,177,000 bbl. of products, an increase of 1,751,000 bbl. or 27 per cent over like period of 1947. Reflected in this increase are deliveries through the company's terminals at Bryan, Clinton, Youngstown, and Cleveland, Ohio, which were put in operation during the 1948 period.

Big-Inch Facilities to Be Completed January 1

Installation of additional compressors aggregating 86,400 hp. now under way by Texas Eastern Transmission Corp. to increase the company's delivery capacity of the Big Inch and Little Big Inch pipe lines to 508,000,000 cu. ft. daily is expected to be completed by January 1, according to R. H. Hargrove, president.

The additional compressors will be apportioned among the 21 existing stations. *(For details of the project see The Oil and Gas Journal, June 10, page 125).*

Kansas-Colorado to Install Compressor

Kansas-Colorado Utilities, Inc., has received Federal Power Commission authorization to install a 800-hp. Worthington compressor at a station near Johnson, Kans., according to Reece E. McGee, president. Kansas-Colorado Utilities has a 6-in. and 8-in. line from Stevens County, Kansas, to Lamar, Colo., with laterals to towns along the system.

Temporary Approval Is Granted Potomac Line

The Federal Power Commission has granted temporary authorization to Potomac Gas Co. to construct an 18-mile, 16-in. natural-gas line from a connection with the existing line of Virginia Gas Transmission Corp. near Dranesville, Va., to Arlington, Va., where it would connect with existing facilities of Washington Gas Light Co. and its subsidiaries.

The proposed line, estimated to cost $1,200,000, would have a peak capacity of 30,000,000 cu. ft. daily and would augment supplies of gas to the metropolitan area of Washington, D. C.

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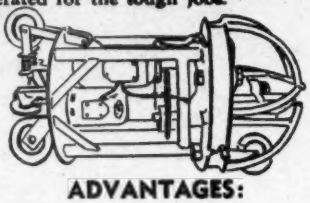

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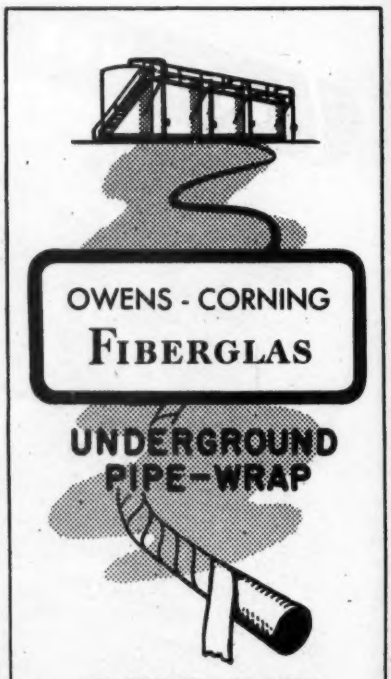

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NATURAL GAS

Government Grants First Subsurface Storage

WASHINGTON.—The Interior Department recently announced the first agreement under legislation enacted in 1946, authorizing the department to permit the subsurface storage of oil or gas in order to avoid waste or to promote conservation of natural resources.

Under the agreement, Michigan Gas Storage Co. ultimately will store 15,000,000 to 20,000,000 M.c.f. of natural gas yearly in federal lands in the Winterfield and Cranberry Lake gas fields in Michigan.

Most of the gas to be stored will be transported from Texas by Panhandle Eastern Pipe Line Co., and the additional facilities are designed to alleviate anticipated natural-gas shortages in the Detroit area, and reduce the consumption of oil in the manufacture of artificial gas used to supplement the natural-gas supply during periods of scarcity.

The department pointed out that while the federal lands constitute only a small portion of the Michigan fields, the agreement establishes an important precedent for similar projects on government-owned lands. The Michigan application was the first and most pressing to be made under the law, but several others are pending and will be acted on in the near future, it said.

Under the agreement, the Government will be paid an annual storage fee and payment in advance for the royalty value of the remaining original gas that will be drawn from the government lands. On certain tracts where the Government owns the mineral but not the fee simple estate the department has renounced any claim for storage fees.

The agreement covers gas deposits and formations down to and including the Marshall formation, but the Government reserves the right to lease or develop all oil deposits regardless of stratigraphic position and any gas deposits below the Marshall formation.

FPC Rejects Panhandle Rate Supplement

The Federal Power Commission has rejected a supplemental rate schedule filed by Panhandle Eastern Pipe Line Co. in purported compliance with the commission's order of July 17 that Panhandle sell and deliver natural gas to Michigan Consolidated Gas Co. at the Detroit delivery point "without restriction as to the locality within which such natural gas may be distributed and resold by Michigan Consolidated throughout its system."

In lieu of the supplemental rate schedule filed by Panhandle Eastern the commission prescribed a supplement which allows Michigan Consolidated to resell throughout its system gas received at the Detroit delivery point.

Brea, Calif., Compressor Station Moved to Colton

Dismantling operations on the compressor station of Southern California Gas Co. at Brea, Calif., have neared completion and equipment is being prepared for removal to the company's new compressor station at Colton, Calif., where the old steam-driven compressors will be replaced by the Brea equipment. The new station is expected to be in operation by September 15 and will transmit Texas gas to the company's eastern division.

Contract for removal of the compressors is held by Mac-Men Co. and Fluor Corp. has contracted to move the cooling tower to the new station after the compressors have been moved. Total cost of the project is estimated at $125,000. The Brea station has been out of service since May 5.

Total capacity of the eight compressors which are of the direct-connected gas-engine driven type, is approximately 1,000,000 cu. ft. per hour.

FPC States Policy On Rate Schedule Changes

WASHINGTON.—The Federal Power Commission recently laid down a policy that changes in the rate schedules of natural-gas transmission companies resulting from increases in taxes may not be put into effect until reviewed, despite tax adjustment clauses in contracts.

The commission made its position known in suspending for hearing supplemental rate schedules proposed by Texas Eastern Transmission Corp. which would increase rates and charges for its sales of gas to reflect the additional tax recently levied on gas production by the Louisiana legislature. The commission announced it would hold a hearing on the matter October 11.

The FPC announcement pointed out that the proposed rate schedules may result in rates and charges which are not definite and certain, since only a portion of the gas sold by Texas Eastern is produced in Louisiana. These rates and charges, it added, may also be unjust and unduly discriminatory.

The company estimated that the increase during the first 12 months of operation of the proposed schedules would be $212,000.

Discussion Subjects Selected for A. G. A. Meet

Discussions of timely and important problems of management, including price, conservation, Government regulations, and personnel problems of the natural-gas industry, will be one of the features of the thirteenth annual convention of the American Gas Association, technical section, and exhibition of the Gas Appliance Manufacturers Association, Ambassador Hotel, Atlantic City, N. J., October 4-6.

A sound-color film, "Eternal Flame," prepared by Columbia Gas Systems, Inc., of New York, which depicts the history of natural gas from the well to the user, is also scheduled on the program.

New York Natural To Buy 10-Mile Line

The Federal Power Commission presiding examiner has authorized, subject to commission review, New York State Natural Gas Corp. to acquire from Empire Gas & Fuel Co. of Pennsylvania and to operate approximately 10 miles of pipe line and to construct and operate three new measuring and regulating stations for the purpose of supplying additional quantities of natural gas to Empire Gas & Fuel Co. of Pennsylvania and to Empire Gas & Fuel Co., Ltd., of New York.

New York State Natural proposes to pay $75,000 for the 10-mile line and to build the measuring and regulating stations at a cost of $23,000.

Amarillo Oil Grants Contract to Blaw-Knox

Amarillo Oil Co. has let a contract to Blaw-Knox Co. for construction of a large gas compressor and dehydration plant in Potter County, Texas, about 25 miles north of Amarillo. Operation of the new plant is scheduled to begin next winter.

Use of compressors will approximately double present pipe-line delivery capacity of natural gas from Panhandle gas field to the Amarillo area.

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Among the Drilling Contractors

Son Acquires Father's Interest in Concern

E. E. Reigle, Midland, Tex., has recently purchased the interest of his father, H. M. Reigle, in Richmond Drilling Co. He will continue to manage the oil properties owned by the concern, and will operate under the Richmond Drilling Co. name. H. M. Reigle, now of Fort Worth, was the surviving partner in Richmond Drilling Co. at the death in 1945 of C. S. Richmond. The company was established in 1914 and has been active in the Permian basin since 1923.

Mallard Drilling Co., Wichita, has sold most of its oil production, comprising interests in 12 Kansas leases, to Consumers Cooperative Association. Consideration was reported to approximate $750,000 and included leases in Ellis, McPherson, Rice, Saline, and Sumner counties, with 28 producing wells.

Mohawk Drilling Co. 1 Marshall, outpost south of the Coyle pool, SE SE SE 14-17n-1e, Logan County, Oklahoma, has set 5½-in. casing at 4,558 ft. and is preparing to test the Skinner.

Olson Drilling Co., Midland, Tex., has contract for Wesley W. Hunt 1 Presidio Trust wildcat, 1,180 ft. from east and 973 ft. from south lines of Section 1, Block 1, D&PRR Survey, 4 miles northeast of Presidio, in Presidio County, Texas. Proposed depth is 5,500 ft.

San Joaquin Drilling Co. is rigging up to drill 1 Howard Park Community in the Northwest Athens extension in California for Pacific Western Oil Corp.

M. & M. Drilling Co., Houston, has contracted for William Helis 1 A. G. Fontenot as a 10,000-ft. test ½ mile off the east flank of Welch dome in Jefferson Davis Parish, Louisiana.

Brown Drilling Co. will drill Honolulu Oil Corp.'s 1 Peterson gas test near Denverton in Solano County, California, at Inglewood.

Grace Drilling Co., Houston, has the contract for a 7,000-ft. well for Fifteen Oil Co., Houston, in Charenton field, St. Mary Parish, Louisiana. The well is 17 South Coast.

Herndon Drilling Co. was making hole below 3,400 ft. at the 1 Bemis, SW SW SE 29-13-19, 1½ miles north of Irvin pool in Ellis County, Kansas. The company has staked location for 1 Loomis, a Lincoln County, Kansas, outpost slightly more than ½ mile southwest of production in West Agra

Crew of D. & D. Drilling Co., of Dallas, at Magnolia Petroleum Co. 5 Humphrey, in Stephens County, Oklahoma. Shown are: Mrs. Joe Dishman; Joe Dishman, tool pusher; Clyde Sell, driller; E. J. Hulsey, motor man; Dalton Gibson, floor man; Guinn Williams, floor man, and Jesse Ellis, derrick man

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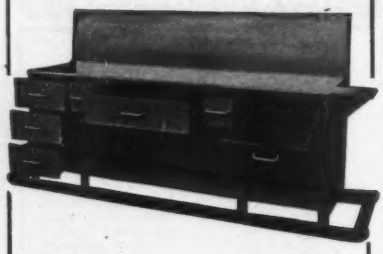

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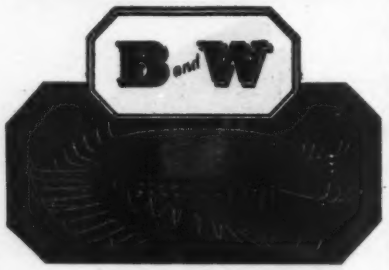

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pool. Spot for the new operation is in NE NE NE 1-16n-3e. Intended depth is 4,200 ft., sufficient to test the Bartlesville sand. Production in the nearby pool is from the Cleveland found at approximately 3,200 ft.

Meredith, Clegg & Hunt, Houston, will drill 2 Viola Smith in North Tepetate field, Louisiana, for Atlantic Refining Co. The test is projected for 8,200 ft.

Lindley Drilling Co., a United States contracting firm, is preparing to open offices in Calgary.

Stice Drilling Co. was rigging up last week for a 6,000-ft. test for Hiawatha Oil & Gas Co. in Duval County, Texas. The wildcat, Hiawatha's 2 Atlee Parr, is 6 miles south of Benavides.

T. P. Pike Drilling Co. is drilling below 10,850 ft. on Marine Exploration Co. State 2 wildcat. It is being slant drilled into a State tidelands lease at Seal Beach, Los Angeles County.

Drilling & Exploration Co., Inc., Dallas, Tex., has had two of its officers elected to membership in the Controllers Institute of America—Gilbert E. Peterson, vice president, treasurer, and director; and Wallace W. March, assistant treasurer of the company.

Nicklos Drilling Co., Houston, was preparing to begin operations this week on Gulf Oil Corp. 4 W. F. Mayes et al, located on an 8,066-acre lease, Charles Dorsett Survey, Abstract 492, about 1¾ miles northwest of Lost Lake production in Chambers County, Texas. The well will be the company's first use of its new heavy-duty power rig. Nicklos also operates seven steam rigs on the Texas and Louisiana Gulf Coast.

Carper Drilling Co, Artesia, N. M., is drilling American Republics Corp. 1 Susie Koonsman, an Ellenburger wildcat in northeastern Scurry County, West Texas. Location is in Section 240, Block 2, H&TC Survey, 15 miles northeast of Snyder, and about the same distance from nearest production to the east in Fisher County.

Keyes Drilling Co. was near the expected pay level last week at the 1 Knipp, NE NE SE 33-19-11, ½ mile northeast of production in Silica pool and separated from the pool by a dry hole. The location is 1½ miles east of Ellinwood in Barton County, Kansas.

Santa Fe Drilling Co. has been awarded contract for Union Oil Co. of California Stearns 102 in Brea-Olinda field. The company is also drilling Athens 19-1 for Union, in Athens-Rosecrans field, and No. 53 in Brea-Olinda field for Brea Canyon Oil Co. Santa Fe is rigging up to drill a wildcat on the San Marcos Ranch in Santa Barbara County for Fred Manning & Associates. The company will also drill the Richards & Rowan wildcat in the Hopper Canyon area of Ventura County, California.

Ralph Lowe, Midland, was rigging up rotary for R. S. Brennand, Jr., and others' 1 Thomas S. Riley, a 5,200-ft. San Andres wildcat in the NE NE Section 35, Block H, D&W Survey, northeastern Gaines County, West Texas. Location is 5 miles south and slightly west of Adair field of Terry and Gaines counties.

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Exploration and Drilling

Louisiana Offshore Area Gets Two More Discoveries

THE offshore exploration campaign in Louisiana got another big boost this week from two oil strikes, both located far east of the previous oil and distillate strikes. Humble Oil & Refining Co. 1 State Lease 801, about 7 miles offshore from Grand Isle, Jefferson Parish, is one. The California Co. 1 Block 69, State Lease 1,278, offshore east of the Mississippi delta and south of Breton Sound, east of Grand Bay and Delta Duck fields in Plaquemines Parish, is the other. The California Co. well is south of the Barnsdall et al gas well on Block 36 in the Breton Sound area. *(See small map, page 153, The Oil and Gas Journal, June 24, 1948).*

The Humble well is credited with flowing at the rate of 800 bbl. daily of 30.9°-gravity oil from 8,640-65 ft. Initial flowing gas-oil ratio was 571 cu. ft. per bbl. Testing may continue as the well was previously reported to have logged 156 ft. of net oil sand between 8,500 ft. and 8,730 ft.

The California Co. well is reported to have flowed at the rate of 200 bbl. daily of 25°-gravity oil from perforations at 5,848-58 ft., through a 5/32-in. choke, with a gas-oil ratio of 215 cu. ft. per barrel.

Humble's well spudded April 9 this year, set 13⅜-in. pipe at 3,453 ft., and drilled to a total depth of 8,600 ft., after striking salt at 7,607 ft. The 7-in. was set at 7,827 ft., to test showings in salt fractures. After finding nothing but shows, it was plugged back to about 3,800 ft., and a new directional hole drilled down dip. The new bottom is estimated to be about 1,036 ft. southwest of the first hole.

The California Co. test was drilled to a total depth of 9,245 ft., and numerous oil shows were reported to have been encountered between 3,700 ft. and 6,700 ft.

Both strikes are rather close to the Mississippi River delta. This emphasizes something often overlooked by those who are not geologists. The Mississippi has actually built (in its delta) a land drilling platform far out into the Gulf, and into the geological basin. Therefore some of the producing fields on the delta are farther out in the geological basin than some of the offshore wells. There are also other land areas in south Louisiana, not on the delta, that geologically are as far out in the basin as wells that will be drilled quite a few miles off the Texas shoreline.

These new strikes should fit into some sort of a regional geological picture that will include all or most of the following producing fields on shore in the vicinity: Quarantine Bay, Bastian Bay, Grand Bay, Delta Duck, Venice, West Bay, Garden Island Bay, Lake Washington, Queen Bess Island, and Barataria Bay.

Most of the south Louisiana onshore fields have been rather small in proven acreage, averaging about 1,000-1,200 acres; only a handful have covered as much as 10,000 proven acres. Reasoning from this to the offshore area, some geologists draw the following prescription for an ideal offshore field. It should have about 1,000 acres of proven area from a pay at about 6,500 ft. At that depth, 8 to 10 directionally drilled wells from a single platform would be enough to develop the reservoir. With luck a 50 million barrel recovery might be expected.

Right now, most of the offshore operators would be happy to settle for any kind of a good field, regardless of how many drilling platforms were required to develop it. After all, platform building know-how is increasing rapidly, and costs for any given size platform are down sharply from 2 years ago.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

OKLAHOMA.—The South Haydenville pool was opened by Mid-Continent Petroleum Corp.'s 1 Holderby, 29-13n-10e, Okfuskee County. The discovery tested 384 bbl. of oil per day from the Gilcrease sand at 2,910-26 ft.

LOUISIANA GULF COAST.—Humble Oil & Refining Co. 1 State Lease 801, 8½ miles off Grand Isle, Louisiana, on a $1,200,000 platform in the Gulf of Mexico, flows at a rate of 840 bbl. daily in test in sidetracked hole. Discovery is Humble's first offshore production.

TEXAS GULF COAST.—An oil producer which flowed at a rate of 406 bbl. daily through 11/64-in. choke was completed by McCarthy Oil & Gas Corp. in the south flank area of Pierce Junction dome in Harris County. Flow was through perforations from 7,268-78 ft.

ROCKY MOUNTAIN AREA.—Sierra Petroleum Co.'s wildcat northeast of Lodgepole in Weston County, Wyoming, has shown oil after perforating 1 ft. of Dakota sand and the operator is now installing pump for a test. Bay's two wildcats in this area are a disappointment. The California Co. is drilling ahead at its Upper Valley wildcat in south-central Utah. The operator has been fishing for the past month. Tests on Carter Oil Co.'s Vernal wildcat, northeastern Utah, have failed to show production.

PERMIAN BASIN.—Richardson & Bass 1 Neal, wildcat in eastern Upton County, recovered 1,890 ft. of fluid, of which 95 per cent was 42°-gravity oil, on drill-stem test of the Pennsylvanian at 9,871-10,096 ft. The Texas Co. et al found the Ellenburger dry in the 1 Jenkins, southwestern Gains County wildcat, but plugged back to the Devonian where the well tested 338 bbl. of fair gravity oil in 12 hours.

NORTH CENTRAL TEXAS.—Consolidated Oil Co. 3 Daves, Wichita County wildcat, may prove Caddo production. Testing continues at the well, which topped the Caddo at 5,182 ft., and found saturation from 5,184-98 ft.

MISSISSIPPI

New Wildcat Producer Indicated in Mississippi

JACKSON. — Wildcat drilling activity in Mississippi last week was featured by reports of tests indicating that Walter E. Sistruck 1 Ralph Stanley, NE NW 8-9n-7w, in Wayne County, Mississippi, promises to become a producer.

The well swabbed an estimated 7 to 10 bbl. of oil per hour with no appreciable amount of water in swabbing test of perforations from 4,845-53 ft. and 4,925-38 ft. Fluid was standing at 1,800 ft. at the end of the test. Operator was preparing to install pumping equipment for final completion. Total depth is 5,507 ft.

Sun Oil Co. 1 State of Mississippi, Section 16-18n-2e, on Eagle Bend dome in Warren County, Mississippi, recovered sandy shale with a show of oil in coring from 3,228-45 ft., and 2 ft. of green porous sand with oil odor and stain and 3 ft. of sandy shale with oil odor in core from 3,245-50 ft. Recovery was 190 ft. of muddy salt water with good blow throughout in drill-stem test from 3,239-50 ft. with ¼-in. chokes and tool open 15 minutes.

In Collier County, Florida, Humble Oil & Refining Co. 1-B Lee Cypress Co. was drilled an dcored to total depth of 11,584 ft. The well is a northwest outpost of the Sunniland field. Casing was being run for production testing after a drill-stem test was made in the Sunniland zone. Humble announced information on the well will be released within a few days.

Nine new locations were announced for Mississippi, two wildcats and seven fields wells. One new wildcat location was made in Alabama. The Mississippi wildcat locations were in Clarke and Wayne counties; the Alabama location, in Choctaw County. Mississippi field locations were in Wayne County, three locations; Adams County, two locations; and one each in Marion and Lincoln counties.

MISSISSIPPI WILDCAT FAILURES

Simpson County: Union Producing Co. 1 Gaylord Container Corp., 24-2n-1e, dry, TD 9,662 ft.

Stone County: Harry I. Morgan 2 Wilbe Lumber Co., 29-3s-13w, dry, TD 9,005 ft.

Walthall County: Humble Oil & Refining Co. 1 T. R. McDonald et al, 27-3n-11e, dry, TD 10,570 ft.

SOUTH LOUISIANA

Tests Indicate Two More Fields in Gulf

NEW ORLEANS.—The heavy investment being made by the industry in Gulf of Mexico drilling and exploration showed more signs of paying off last week when the second and third oil-producing areas were indicated by production tests.

There was considerable excitement among Gulf Coast oil men when Humble Oil & Refining Co. reported its 1 State Lease 801, Grand Isle, Louisiana, flowed at the rate of 840 bbl. daily. A day earlier, The California Co. brought in its 1 State Lease 1278, Block 60, North Pass area, as another new offshore oil discovery.

The Humble well is a sidetracked hole to the southwest drilled from the elaborate $1,200,000 platform the company constructed in about 50 ft. of water 8½ miles off Grand Isle, Jefferson Parish. The sidetracked hole was bottomed at 8,951 ft. where 9⅝-in. pipe was cemented. The 840-bbl. flow rate was made through perforations from 8,640-65 ft. Gas-oil ratio was 575-1, gravity 30.90°, and flowing pressure on the tubing was 1,320 psi. Humble was expected to drill ahead.

Humble, regarded as the most active operator in the Gulf of Mexico, was reported last week also to have found a good sand section in the upper part of the 4,400-ft. level in another offshore test, 1 State Lease 799, Caminada Pass Account 4. This well has proved another salt dome in the Gulf.

The California Co.'s North Pass discovery is about 6 miles east of Delta Duck field in Plaquemines Parish. Operators continued to test after the well flowed at a rate of 196 bbl. daily, 26.7°-gravity oil, through a 10/64-in. choke from perforations at 5,848-57 ft. Total depth was 9,150 ft., and 9⅝-in. protection pipe was cemented to 6,930 ft. The California Co. discovery was the first offshore oil production since Kerr-McGee Oil Industries, Inc., brought in its Block 32 well last November.

Interest in land drilling and exploration activity in South Louisiana centered on a new discovery and several locations in the north central section in Avoyelles and Rapides parishes. H. L. Hunt 1 Harry H. Edwards came in as a discovery well in the Avoyelles Prairie area of Avoyelles Parish. Final gage through an ⅛-in. choke was 180 bbl. with flowing pressure on tubing of 1,450 psi. Total depth was 9,117 ft., and pipe was perforated with 36 shots from 7,926-32 ft. Oil is 48.1° gravity.

Hunt staked a confirmation test for the Avoyelles Prairie area ¼ mile northwest of the 1 Edwards. Kirby Petroleum Co. completed spudding for a 7,500-ft. Wilcox test in the Forrest Hill area of Rapides Parish, and The Chicago Corp. contracted for a

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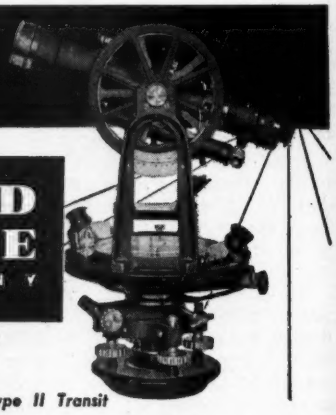

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12,000-ft. test in the Miltonberg area of the same parish.

Twenty-three new locations, including seven wildcats, were reported last week in South Louisiana. Six field wells were located in St. Mary Parish. Other locations were 3 each in St. Landry and Jefferson Davis, 2 each in La Fourche, Beauregard, and Rapides parishes. One location each was announced for Acadia, Avoyelles, East Baton Rouge, St. Martin, and Vermilion parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

St. Charles Parish: New gas-condensate sand, Paradis—The Texas Co. 20 Sunset Realty & Pltg. Co., 39-14s-20e, TD 13,760 ft., first well in field to find salt, top salt 13,558 ft., perf. 11,042-11,102 ft., PT 48 bbl. condensate daily with 1,640,000 cu. ft. gas through 5/32-in. choke, GCR 34,264, TP 3,600 psi., 51.8° gravity, no water.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Kirby Petroleum Co. 1 Mrs. M. Clement et al, 51-9s-2w, 1 mi. off N flank Jennings dome, dry, TD 10,027 ft.

Terrebonne Parish: Hunt Oil Co. 1 Unice, Watkins, Finney et al, 59-19s-17e, dry, TD 12,888 ft.

SOUTHWEST TEXAS

Completion in Gas Sand Sought in Cecil Area

CORPUS CHRISTI.—A completion in the 5,900-ft. gas sand in the Cecil area of southwestern Hidalgo County is being sought in Coastal Refineries, Inc., and M. L. Massingill B-1 Garcia Land & Livestock Co.

The well was drilled to a total depth of 6,252 ft., plugged back to 5,943 ft. and a drill-stem test made from 5,928-43 ft. The well tried to blow out from this section, and the 4½-in. drill pipe became stuck in the hole. An attempt at completion through the drill pipe will be made.

The well is located 50 ft. west of the east line of Porcion 42 at a point 667 ft. north of an extension of the north line of Lot 22 of Porcion 45. It is 7 miles northeast of Sullivan City and a third of a mile west of the operators' A-1 Garcia Land & Livestock Co. oil discovery in the 4,000-ft. sand. Unsuccessful attempts to complete for commercial production in the 5,900-ft. sand previously were made in Coastal Refineries 1 Yturria Land & Livestock Co. and in Clark Fuel Production Co. 1 Daskam et al.

In Duval County, Holly Development Co. and Barbara Oil Co. 2 Driscoll Estate swabbed oil of 23.8° gravity at the rate of 50 bbl. daily from perforations at 2,517-32 ft. This well is a discovery for a new area about 2½ miles southeast of Rancho Solo field and 4½ miles northwest of Conoco Driscoll field. Total depth is 2,532 ft. with 5½-in. casing on the bottom.

A new oil-field discovery, Henderson Coquat 2 H. A. Dillon, located 4 miles southwest of Catarina in Dimmitt County, was being tested on the pump. Completion was from open hole at 4,890-4,932 ft. in the Navarro sand topped at about 4,900 ft. Amber-colored oil of 42° gravity was swabbed from this zone.

In the Mercedes field area of southeastern Hidalgo County, V. E. Cook, trustee, 1 Barrow was being tested in a new sand zone for the field at about 8,600 ft. Operators set 6⅝-in. casing to about 8,700 ft. after drilling to a total depth of 8,938 ft. Previous production in the field was from the 7,500-ft. and 8,800-ft. levels.

Thirty-six locations were reported last week for the Southwest Texas area included in Railroad Commission Districts 1 and 4. Eight of these were in Duval County, six in Nueces County, and three each in Brooks, San Patricio, and Starr counties. Two locations each were reported for Jim Hogg, Zapata, Edwards, McMullen, and Milam counties; and one each for Arkansas, Webb, and Caldwell counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Duval County: Gas-well discovery—Edwin B. Cox & Jake L. Hamon 1 Leila Peters, J. Poitevent Sur. 159, A-385, between North Kohler & Rancho Solo-extension fields, perf. Government Wells sand, TD 2,532 ft., PT 9,500,000 cu. ft. gas daily open flow, SIP 740 psi., no water.

Starr County: Gas-condensate discovery—Sunray Oil Corp. 1 T. B. Slick Est., in El Panal Gr., 3½ mi. E Rincon field, 2½ mi. SE Yzaguirre field, about 3,400 ft. SE from NE cor. Sur. 267, top pay 4,671 ft., TD 6,005 ft., perf. 4,671-79 ft., PT 2,200,000 cu. ft. gas daily open flow with spray of condensate, SIP 1,835 psi., no water.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Atascosa County: J. C. McCabe & Pegg Bros. 1 Mellie Smith, I&GN Sur. 514½, A1115, 9 mi. W Poteet, dry, TD 3,526 ft.

Brooks County: Southern Minerals Corp. 1 D. J. Sullivan, Lots 7-8, Blk. 15, Falfurrias Farm & Gdn. Tds., 2 mi. W-SW Falfurrias and SW La Gloria field production, dry, TD 8,522 ft.

Cameron County: A. W. Smith, trustee, 1 McCorkle, Wehmeyer Subd., La Feria Gr., 3 mi. S-SW Lacy field, TD 8,500 ft.

Duval County: John F. Camp & Sons E-3 James F. Welder Heirs, AB&M Sur. 227, A-19, 1¼ mi. SW E-2 gas well, dry, TD 4,008 ft.

J. W. Foreman 1 Gertrudis Canales, 3,800 ft. SW Tex-Mex RR & 2 mi. NE Crestonio, dry, TD 4,954 ft.

The Texas Co. 1 Amando C. Garcia et al, 10.9 mi. N-NW San Diego & 1½ mi. NE Fitzsimmons field, dry, TD 5,041 ft.

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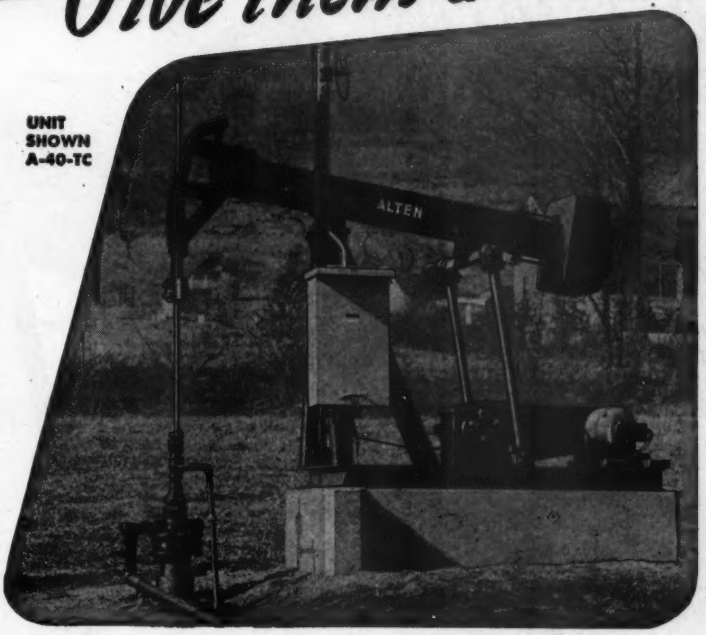

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Trio Oil Co. & B. O. Renick 1 Farmers Life Insurance Co. of Denver, 16 mi. NW San Diego, about 2 mi. N-NW Squire field & 1½ mi. W-SW Strakeifeld, dry, TD 4,073 ft.

Edwards County: Wm. C. Gervie 1 Paul Purney, 35 mi. NW Rock Springs & 2 mi. E Turney field, dry, TD 486 ft. (486 correct).

Guadalupe County: R. L. Turner & James H. Eddy 1 August G. Bode, 8 mi. E Seguin, dry, TD 2,456 ft.

Jim Hogg County: The Texas Co. 2 C. W. Hellen, Sch. Ld. Sur. 150, A-385, 6 mi. NW Hebbronville, dry, TD 3,014 ft.

Nueces County: Renwar Oil Corp. 1 F. J. Smith, Laureles Farm Trs., Sec. 33, 10 mi. S Corpus Christi, dry, TD 6,015 ft.

McMullen County: Newman Bros. & Jergins Oil Co. 1 M. L. Grimes, J. Poitevent Sur. 21, A-364, 11 mi. SW Tilden, dry, TD 5,906 ft.

Milam County: Patrick H. Downing 3 J. L. Byrd, J. J. Acosta Gr., dry, TD 1,410 ft.

Taylor Refining Co. 2 R. L. Batte, G. M. Gilliland Sur., 1½ mi. NE Milano, dry, TD 3,116 ft.

San Patricio County: Arnold O. Morgan 1 V. R. Blacklock, about 1 mi. S North Odem area and 3½ mi. E-NE Odem field, in G. Winters Sur., A-275, dry, TD 7,610 ft.

United Producing Co. 1 Bettie Elick, 4 mi. N-NW Gregory, in J. Crouch Sur., A-87, dry, TD 6,250 ft.

Starr County: Ike Howeth et al 1 Paula G. Moreno et al, Porc. 70, 10 mi. N Roma, dry, TD 4,701 ft.

T. L. Sullivan et al 1 Manuela Hinohosa et al, Porc. 109, 25 mi. NW Rio Grande City, dry, TD 1,640 ft.

W. W. Whiteman, Jr., 1 Gabriela Sanchez et al, Porc. 74, 12 mi. N-NE Roma & 5 mi. W-SW El Sauz, dry, TD 1,270 ft.

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PERMIAN BASIN

Upton County Wildcat Has Good Show in Test

MIDLAND.—Richardson & Bass 1 H. F. and A. D. Neal, eastern Upton County wildcat, ran a 2-hour drill-stem test of the Pennsylvanian from 9,871-10,096 ft. Using 18 stands of water cushion, it showed gas at the surface in 33 minutes, and began to unload after two stands had been removed. In addition to the water blanket, the recovery was 1,890 ft. of fluid which tested approximately 95 per cent 42°-gravity oil. There was no formation water. Flowing bottom-hole pressure ranged from 1,000-1,400 psi. Shut-in pressure was 5,800 psi. in 30 minutes. Previous to the test, operators pumped in 7,000 gal. of heavy mud as a precaution against blowout. The well previously sprayed drilling fluid while drilling around 10,050 ft. After the test it drilled ahead.

The Texas Co., Humble Oil & Refining Co., and Ralph Lowe 1 T. E. Jenkins, Ellenburger test in southwestern Gaines County, 6 miles north of Union field, found the Ellenburger dry but plugged back to make a prolific producer in the Devonian. The 1 Jenkins entered the Ellenburger at 11,398 ft., 7,980 ft., subsea, and recovered 1,175 ft. of gas-cut salt water on a drill-stem test from 11,465-11,519 ft. Total depth was 11,705 ft., in the pre-Cambrian.

Completion tests in the Devonian gaged a flow of 338 bbl. of 27°-gravity oil in 12 hours through open 2-in. tubing, from perforations at 9,100-9,135 ft. The well had kicked off after being swabbed. Tentative top on the Devonian was reported at 9,116 ft., on an elevation of 3,418 ft., which is said to place it some 884 ft. high to Shell Oil Co., Inc., 1 Sparks, dry hole 3½ miles to the northeast.

Seaboard Oil Co.'s Pennsylvanian discoveries this year have greatly increased the relative importance of that geologic system in West Texas. This week a fourth well was nearing completion in the Vealmoor field of northwest Howard County. Seaboard's 2 J. C. Caldwell, 1,650 ft. east and slightly north of the discovery, ran a 1-hour drill-stem test in the Cisco limestone from 7,840-80 ft. Gas came to the surface in 5 minutes, mud in 12 minutes and oil in 14. It flowed 40 bbl. of oil in 46 minutes, and unloaded 11 bbl. of oil after the tool was closed. Recovery from the drill pipe was not estimated. Casing was to be run to bottom and perforated for completion. The 2 Caldwell is 660 ft. from east and 700 ft. from north lines of Section 32, Block 32, T&P Survey. Seaboard's 1 D. C. Zant, northwest of the discovery, was drilling near 6,000 ft.

Seaboard announced location for an extension test, approximately 1 mile northwest of production at Vealmoor, into Borden County, at its 1 M. Clanton. Location is 1,980 ft. from south and 660 ft. from west lines of Section 20, Block 43, T&P Survey, and ⅝ mile north of the Howard-Borden County line. Projected depth is 8,000 ft.

Seaboard's Cisco discovery in Terry County, the 1 E. M. Hinson, expected to increase production by washing open hole between 9,400-55 ft. with 500 gal. of mud acid, plus 2,000 gal. of regular acid. An earlier flow test yielded around 9 bbl. of oil an hour.

Humble Oil & Refining Co. completed its 1 T. E. Lutrick, as the second well in the West Petersburg field of southern Hale County, for a pumping potential of 27.9 bbl. of oil. Pay section is the Cisco lime at 7,945-8,065 ft. Location is a southwest offset to the company's 1 J. A. Lutrick, discovery well.

In Midland County, Gulf Oil Corp. 1-E Bryant was drilling at 12,396 ft. in the Devonian. It is 14 miles south of Midland. The Texas Co. 1 Sharbauer, 1 mile south of the Midland Air Terminal, was drilling ahead below 9,210 ft.

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WEST TEXAS (DISTRICTS 8 & 7-C)
SUCCESSFUL WILDCAT

Runnels County: Geochemical Oil Co. 1 J. W. Freeman, Sec. 357, Thos. R. Webb Sur., 4½ mi. SW Crews, pumped 48 bbl. 40°-gravity oil a day, pay 3,390-3,405 ft., TD.

WEST TEXAS (DISTRICTS 8 & 7-C)
WILDCAT FAILURES

Andrews County: Stanolind Oil & Gas Co. 1 E. C. Nix "B," Sec. 2, Blk. A-41, PSL Sur., dry, TD 408 ft.

Mitchell County: Fullerton Oil Co. et al 1 E. T. Strain, Lot 10, George J. Reigers Sur., 9 mi. NE Colorado City, dry, TD 7,952 ft., Tubb 2,600 ft., Wolfcamp 4,600 ft., Mississippi 7,774 ft., Ellenburger 7,862 ft., elev. 2,258 ft.

Sutton County: Fred M. Manning, Inc., 1 Margarett Schweining, Sec. 53, Blk. A, GWT&P Sur., 3 mi. W of E line of Sutton County, dry, TD 5,250 ft., Ellenburger 3,935 ft., elev. 2,202 ft.

Runnels County: Petroleum Southwest Corp. 1 Paul Getty, Norvell Travis Sur. 533, 10 mi. NE Ballinger, dry, TD 4,506 ft., Caddo 4,256 ft., Ellenburger 4,385 ft., dolomite 4,400 ft., elev. 1,791 ft.

Tom Green County: American Republics Corp. 1 C. D. & C. L. Atkins, Robert Smith Sur., 4½ mi. W Christoval, dry, TD 7,329 ft., Clear Fork 510 ft., Wolfcamp 2,990 ft., Palo Pinto 5,338 ft., Strawn 6,136 ft., Ellenburger 6,803 ft., elev. 2,273 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Barnsdall Oil Co. 1-A State, 23-8s-32e, Chaves County, was drilling ahead at 8,656 ft. in lime. According to some correlations, it should be in the Pennsylvanian. Richfield Oil Corp. 2 Comanche Unit, 24-11s-26e, continued testing but may perforate and test up the hole. After rigging up a pumping unit, it gaged 200 bbl. of fluid in 24 hours, cut 60 to 70 per cent with salt water. The following 24 hours it pumped 24 bbl. of fluid, with the same cut. Humble Oil & Refining Co. 1-U State, 10-12s-27e, was drilling lime and chert at 7,447 ft. Operators thought it might be in the Devonian. If it is still in the Pennsylvanian section, the test is running low, according to reports.

In Eddy County, Magnolia Petroleum Co. 1 Foster Unit, 26-20s-23e, was a new 3,500-ft. wildcat, 12 miles southwest of Lakewood. It was drilling at 735 ft.

Five miles west of the Crossroads field, Lea County, Vickers Petroleum Co. 1 Continental-Barnes, 26-9s-35e, was drilling anhydrite and salt at 3,870 ft. Based on top of the Yates at 2,860 ft., elevation 4,117 ft., it is running 74 ft. low to the Crossroads discovery. The 1 Continental-Barnes is a 4,600-ft. San Andres test. Skelly Oil Co. 1 U. D. Sawyer, 33-9s-36e, was drilling below 8,456 ft. No tops have been released below the Clearfork.

Texas Pacific Coal & Oil Co. 39-A State, 9-22s-36e, deep test in the South Eunice area, had total depth at 10,800 ft. in dolomite and planned to drill ahead to 12,000 ft. Skelly Oil Co. 7 R. R. Sims, 3-23s-37e, had total depth at 10,204 ft. and was preparing to plug back after recovering salt water on two tests of the Ellenburger. A 3-hour test was run from 9,982-10,030 ft., and the second test was from 10,030-10,115 ft. It will back up to test the Drinkard section.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Chaves County: Atha Exploration Co. 2 Lightcap, SW NW 24-7s-28e, Elkins area, dry, TD 2,885 ft., Grawbr(*"¼ ¼ ¼a¼aa dry, TD 2,885 ft., Grayburg 1,690 ft., San Andres 1,858 ft.

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APPALACHIAN FIELD

West Virginia Continues Exploratory Activity

PITTSBURGH.—West Virginia reports several wildcat wells having reached important stages in drilling. In Sheridan district, Calhoun County, Godfrey L. Cabot, Inc., is running 5-in. casing at 5,625 ft. at the 1-880 Mary V. Bunner, topping the Corniferous lime at 5,612 ft. In Wolf Creek district, Monroe County, this company reached the Oriskany sand at 6,548 ft. and is drilling at 6,577 ft. at the 1-1239 Margaret Twohig with a starting surface elevation of 1,715 ft. In Steele district, Wood County, Columbian Carbon Co. 1 Leslie Thompson, elevation 746 ft., is drilling at 4,830 ft. with the top of the Oriskany sand at 4,818 ft. In Grant district, Jackson County, United Carbon Co. 3 Nathaniel Waterbury, elevation 952 ft., set 7-in. casing at 4,883 ft., with Corniferous lime at 4,871 ft. In Big Creek district, McDowell County, United Fuel Gas Co. is drilling at 5,335 ft. at the 1-6219 New River & Pocahontas Coal Co., elevation 1,627 ft.

In the closely confined oil pool near Silverton in Ravenswood district, Jackson County, Spartan Gas Co. 1 J. Clayton Kuhn showed for 15 bbl. in the Berea sand, total depth 2,133 ft. Henderson & Gallaspie No. 1 Olive A. Davis showed for 50 bbl. after shot, total depth 2,142 ft. A good gas well was brought in by Columbian Carbon Co. in Logan district, Logan County, when the 1076 Island Creek Coal Co. tested 1,852,000 cu. ft. of gas in the Big lime, total depth 1,960 ft.

New locations in West Virginia totaled 27: in Ravenswood district, Jackson County; Elk and Poca districts, Kanawha County; Court House and Skin Creek districts, Lewis County; Harts Creek and Laurel Hill districts, Lincoln County; Union district, Marion County; Harvey district, Mingo

County; McKim and Union districts; Pleasants County; Clear Fork district, Raleigh County; Harper and Reedy districts, Roane County; Lincoln district, Tyler County; Buckhannon district, Upshur County; Grant and Union districts, Wayne County.

In southwest Pennsylvania, Manufacturers Light & Heat Co. 8 Barton Estate, Georges Township, Fayette County, is drilling at 9,437 ft., or 2,130 ft. below the top of the Oriskany sand. Orville Eberly et al, in this same area, are drilling at 5,104 ft. in the 1 John Dulick.

Five new locations were reported: one each in Mahoning Township, Armstrong County; Limestone Township, Clarion County; Porter Township, Jefferson County; Nottingham Township, Washington County; and Allegheny Township, Westmoreland County.

TEXAS GULF COAST

Gas, Condensate Wells Reported Completed

HOUSTON.—Gas and gas-condensate discoveries were reported last week in the completion of several current wildcat and field extension wells in the Upper Gulf Coast area.

Houston Oil Co. of Texas 1 Houston Oil and American Republics fee, Village Mills west extension test, was completed as a gas producer. The well is in the E. Lubititit Survey in Hardin County. Hole was drilled to 9,386 ft. Perforations with 120 shots were made from 8,944-80 ft., and on 5/16-in. choke, flow was 4,800,000 cu. ft. of gas daily with flowing pressure on the tubing recorded at 2,210 psi. Open-flow calculation was estimated at 11,500,000 cu. ft. daily.

In Newton County, Houston Oil's 1 Newton County Lumber Co. was completed, and on a 24-hour flow test, the well made 19.65 bbl. of condensate along with 4,103,000 cu. ft. of gas through a ¼-in. choke. The well was a confirmation test to American Republics Corp. Newton County Lumber Co. discovery in the South Gist area in a new producing zone. In the Houston Oil test, hole was drilled to 7,707 ft. and topped the new pay at 7,556 ft. Perforations were from 7,556-80 ft.

In Liberty County, William Hebert Hunt, Trustee Estate, completed 1 Welch & Silva as a new gas-condensate discovery 2 miles north of Cottonwood field production. The discovery is ¾ mile northwest of Skelly Oil Co. 1 Welch et al 7,752-ft. dry hole. In the 1 Welch & Silva, initial flow on an adjustable choke was 87 bbl. daily of condensate and 3,160,000 cu. ft. of gas. Total depth was 8,296 ft. and 5½-in. casing cemented at 8,202 ft.

Stanolind Oil & Gas Co. 2 A. S. Moody, deep test on the northeast side of oil production in the gas area of Clinton field of Harris County, on initial test flowed gas from the 8,000-ft. level. Pipe was perforated from 8,002-12 ft., and on ¾-in. choke, flow was 3,000,000 cu. ft. of gas daily. Testing was continuing.

McCarthy Oil & Gas Corp. completed another oil producer in the south flank area of Pierce Junction dome in Harris County. The well, 3 O. W. Fordyce, was drilled to a total depth of 7,381 ft., perforated from 7,268-78 ft., and flow through 11/64-in. choke was 406.57 bbl. of 39.2°-gravity oil daily with tubing pressure of 1,350 psi. Gas-oil ratio was 647.1. Humble Oil & Refining Co. 7 Cedar Point State, wildcat about 1½ miles southwest of Cedar Point field in Chambers County, flowed 70 bbl. of oil daily on test. Perforations were made in the 6,100 and 6,200 ft. levels. The well is on a lease in Galveston Bay. Hole was drilled to 7,020 ft.

Locations announced last week for the Gulf Coast area included in Commission Districts 2 and 3 totaled 47. Number of locations by counties follows: 7, Harris; 6, Wharton; 5, Victoria and Brazoria; 3, Liberty, Goliad, and Refugio; 2 Jefferson, Fort Bend, Bee, and Calhoun; and 1, Austin, Hardin, Matagorda, Montgomery, Orange, Galveston, and Jackson.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Fort Bend County: Gas-condensate well, Needville extension test—Union Producing Co. 1 Annie Sacaris et al, H&TC Sur., Sec. 26, TD 6,259 ft., perf. 6,117-26 ft., PT 910,000 cu. ft. gas daily and 5.63 bbl. condensate daily, GCR 161,548, TP 2,100 psi., SIP 2,240 psi., no water.

Hardin County: Gas discovery, West Village Mills—Houston Oil Co. of Texas 1 Houston Oil & American Republics fee, Wilbur Cherry Sur., 7 mi. NE Bragg twst. & 5 mi. W Village Mills prod., TD 7,300 ft., perf. 6,026-36 ft., PT 4,944,000 cu. ft. gas daily with ¼-in. choke, TP 2,380 psi., SIP 2,552 psi., no water.

Harris County: New oil sand, Humble—The Texas Co. 1 M. R. Klease fee, John B. Jones Sur., Lot 5, Blk. 2, top sand 7,266 ft., TD 4,011 ft., perf. 3,640-78 ft., PT 185.76 bbl. oil daily with 16/64-in. choke, GOR 264, TP 150 psi., 27.3° gravity, no water.

Newton County: Gist area, gas-condensate well—Houston Oil Co. of Texas 1 Newton County Lumber Co., J. Harding Sur., 1¾ mi. S Gist field prod., top sand 7,556 ft., TD 7,707 ft., perf. 7,556-80 ft., PT 4,103,000 cu. ft. gas & 19.65 bbl. condensate daily with ¼-in. choke, GCR 50,891, TP 2,736 psi., SIP 2,825 psi., no water.

Victoria County: Oil discovery well, Anaqua—Baldridge & King et al 1 May Ward Williams, S. Serna Gr., A-106, 2,840 ft. SE Gulf's 1 Simmons gas discovery well, top pay 5,527 ft., TD 5,533 ft., perf. 5,529-33 ft., PT 87.68 bbl. daily with 8/64-in. choke, GOR 1,990, TP 900 psi., gravity 33.4°, no water.

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TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: O. W. Killam 1 William H. Russell Est., Fernando Rodriquez Sur., dry, TD 1,450 ft.

Fayette County: Continental Oil Co. 2 Charles Vinklarek, Cistern Hill area wildcat, Samuel Millet Lge., A-70, 2½ mi. N Cistern field production, dry, TD 8,673 ft.

Jefferson County: Chance Bros. Drilling Co. 1 Schuchardt, BBB&C Sur., A-81, junked hole, TD 8,592 ft.

J. C. Wynee et al 1 Mary E. Fitzhugh, Big Hill area wildcat, Wm. McFadden Sur., junked hole, TD 3,499 ft.

Liberty County: Placid Oil Co. 1 H. Purswell, Moses Donaho Sur., A-25, approx. 2 miles N McCoy prod., dry, TD 9,232 ft.

Montgomery County: W. F. Newton 1 Carton, West Conroe area wildcat, John McDillon Sur., dry, TD 5,014 ft.

CALIFORNIA

Edges of Colgrove, Russell Areas Defined

LOS ANGELES.—Completion of two Richfield wells in the Cuyama Valley during the past week apparently has defined the southeastern productive limit of the Colgrove area and the northwestern productive limit of the Russell productive area. Abandonment of the Richfield 73-31 Quality, 31-11n-27w, definitely would seem to put a southeastern limit to the Colgrove area. This well is approximately 1 mile from producing wells on the Colgrove lease and is on a direct line between this lease and the Russell lease.

Completion of the 17-5 Russell, 5-10n-27w, as a very small pumper also indicates that the northwestern commercial limits of the Russell area have been reached. If the 17-5 Russell and the 73-31 Quality prove to be limiting wells of the two areas, then it has been proved definitely that two fields were discovered originally and that they are separated by a comparatively large nonproductive area.

Richfield, however, is going ahead with its exploration and development programs in the two areas and has staked location for three more wells. Two of these are in the Colgrove producing area and will be known as the 27-30 Anderson and the 38-30 Anderson, both located in 30-11n-27w. The third well, to be known as the 1 F. K. Perkins, 27-10n-26w, is strictly a wildcat venture located about 11 miles southeast of nearest production in the Cuyama Valley. Travers Oil Co. and Gibson Drilling Co. also have announced that they plan to drill a test in the Cuyama Valley. This will be located about 1¼ miles northeast of the Richfield Russell wells in Section 33-11n-27w.

Electric log is now being run at the Marine Exploration Co. 2 State, 11-5s-12w, in the Seal Beach area of Los Angeles County, to determine what may have been encountered during the course of drilling. Bottomed at 11,267 ft., this well is probably one of the most difficult drilling jobs ever undertaken. Location is about ½ mile from the ocean shore and originally plans of the operator were to bottom the well out under the ocean approximately 1 mile from the shoreline. Because of the high angles of deviation from the vertical many drilling difficulties have developed, but persistence on the part of the operators has enabled them to overcome all difficulties so far. Several showings of gas and a few oil shows reportedly were encountered during the course of drilling.

Standard Oil Co. of California is grading location to drill a new venture in the Summerland area of Santa Barbara County. The well will be known as the 1 Williams and it will be located in Section 16-4n-26w. Standard has just signed community leases for a considerable portion of the Summerland Townsite, which covers approximately 90 acres, and community leases for another 100 acres of residential property which lies outside the townsite limits. Production at Summerland was originally discovered 50 years ago and brought the first offshore drilling from piers in California. At one time there were more than 60 productive wells in operation, but only two remain at the present time. One of these produces from 220 ft. and the other from 1,300 ft.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Race Track area: Standard Oil Co. of California 1 Hermle, 22-11n-1w, IP 1,659,000 cu. ft. gas through ¼-in. choke, perf. 2,450-87 ft., elev. 271 ft., TD 2,675 ft.

Wheeler Ridge area: Richfield Oil Corp. 13-28 Gordon, 28-11n-20w, pumped 100 bbl. in 14 hours, gravity 22.8°, water cut 23 per cent, elev. 1,401 ft., TD 1,360 ft.

San Benito County, Ciervo area: The Texas Co. 1 Nicholas, 27-16s-12e, pumped 19 bbl. daily, gravity 24.8°, water cut 1 per cent, elev. 1,561 ft., TD 1,252 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Arvin area: Miller & York 1 DiGiorgio Farms, 6-31s-30e, dry in granite, elev. 556 ft., oil stained sand 1,020-1,125 ft., weathered granite 1,395 ft., 1,421 ft.

Blackwells Corner area: Woodward and Reynolds 3 Mabury, 25-26s-18e, dry, elev. 576 ft., TD 1,014 ft.

Comanche Point area: Homer Grizzle 1 Grizzle, 1-11n-18w, dry, elev. unknown, Santa Margarita 725 ft., TD 800 ft.

Edison area: The Superior Oil Co. 1 Morton-Nissen, 20-30s-30e, dry, elev. 728 ft., TD 2,090 ft.

Globe Anticline area: Shell Oil Co., Inc., 1 Vedder-USL, 9-31s-22e, dry, elev. 1,527 ft., TD 10,319 ft.

Shale Hills area: Miller & York 1 Mount-

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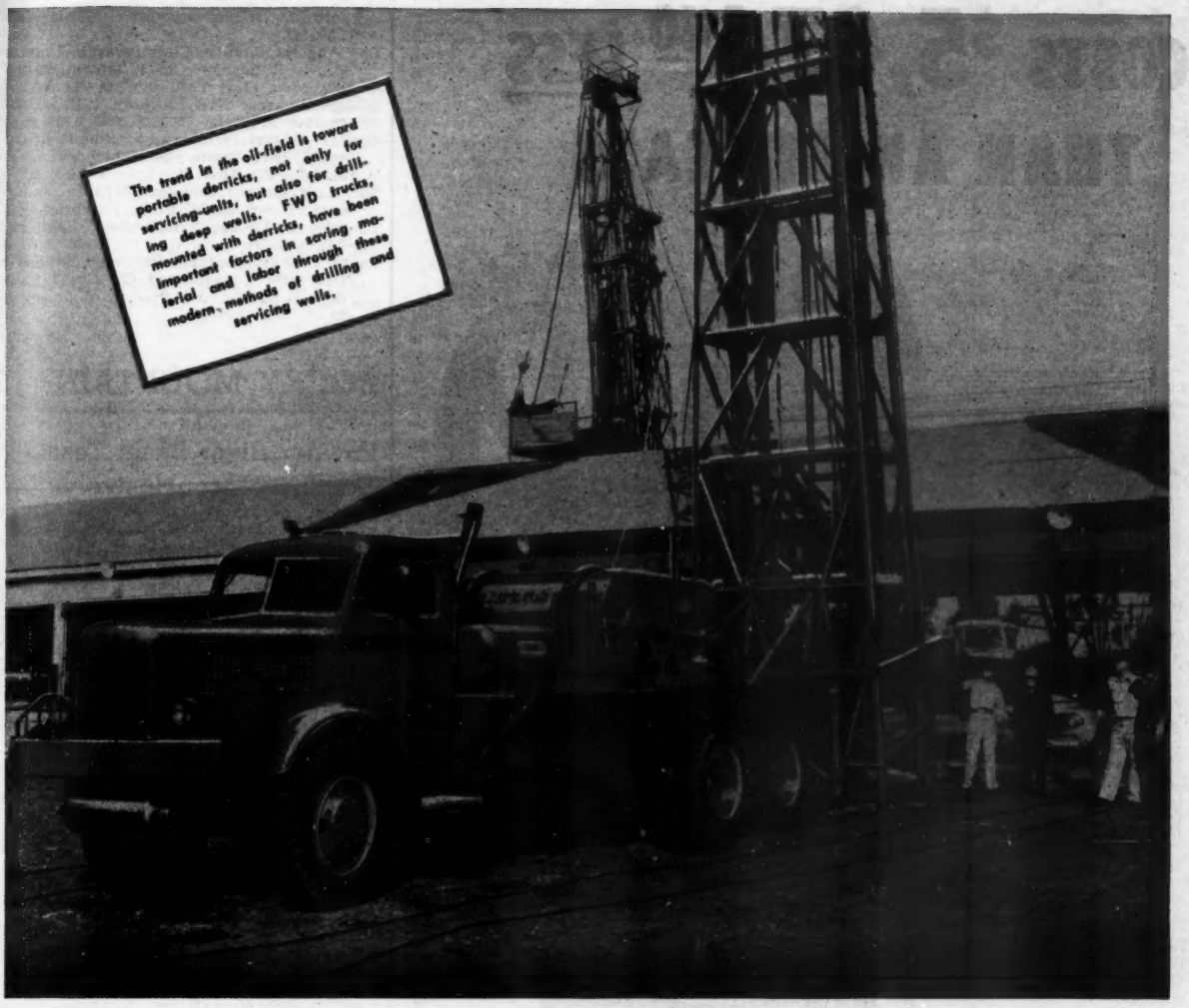
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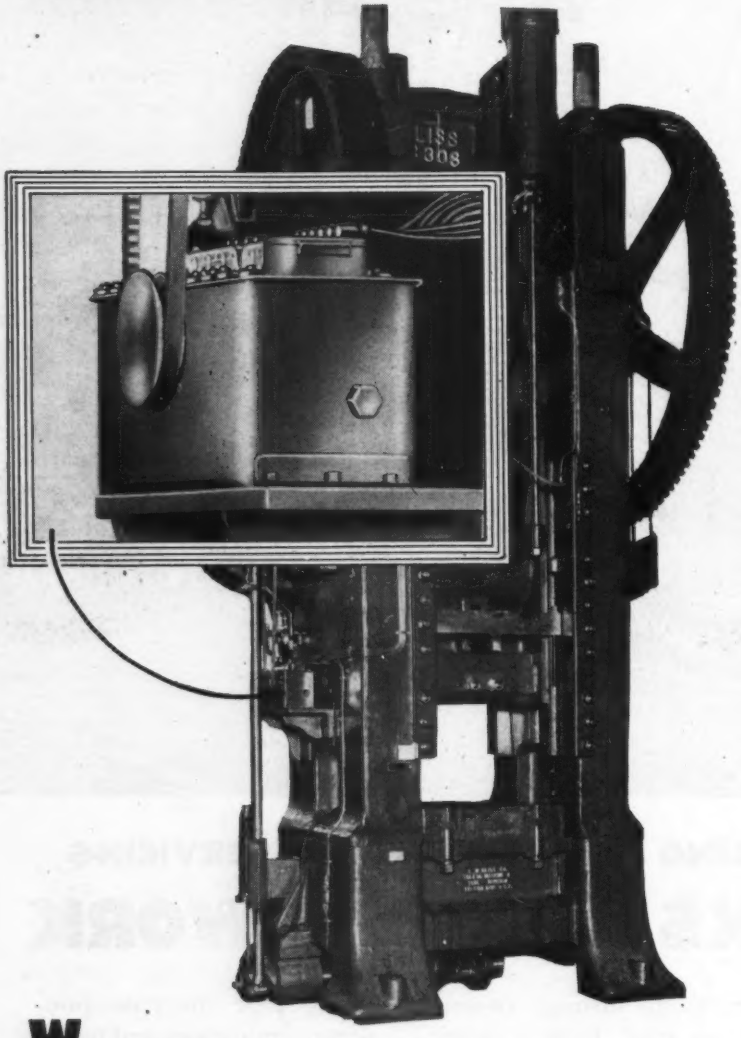

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ford, 18-27s-19e, dry, elev. 979 ft., TD 1,598 ft.

Los Angeles County, Elsmere area: Lomita Oil Well Service Co. 1 Traver, 29-4n-15w, dry, elev. 1,350 ft., TD 743 ft.

Newhall area: Ned Barmore 1 Hays, 36-4n-16w, dry, elev. 100 ft., TD 2,387 ft.

Orange County, Olive area: Standard Oil Co. 1 Taft Comm., 20-4s-9w, dry, elev. 242 ft., TD 3,095 ft.

San Luis Obispo County, Cuyama Valley area: Richfield Oil Corp. 1 Cebrian Estate, 23-11n-28w, dry, elev. 1,933 ft., TD 3,860 ft.

Santa Barbara County, Pt. Arguello area: Universal Consolidated Oil Co. 3 Sudden, 35-6n-36w, dry in gray shale, elev. 60 ft., TD 2,284 ft.

ROCKY MOUNTAIN

Powder River Basin Tests Continue Inconclusively

DENVER.—In the Lodgepole-Mush Creek area, on the east side of the Powder River Basin, encouraging results have been obtained by Sierra Petroleum Co. on its 1 Kummerle, C NE SE 14-45n-65w, Weston County, Wyoming. The operator perforated Dakota between 5,380-81 ft. with nine shots and the hole filled with 5,200 ft. of clean oil and no water. The operator is now installing pump for tests of the well. This well was drilled to 5,499 ft., total depth, and topped the Dakota at 5,376 ft. Drill-stem tests in the sand showed oil and water and casing was run through the sand for selective perforating and testing. This well is northeast of Bay Petroleum Corp.'s Lodgepole area, where two wells have now been completed.

Bay's first well at 1 Christensen-Davis, C NW SE 9-44n-66w, has been suspended indefinitely pending further drilling activity in the area. The well caused considerable excitement when oil was recovered on drill-stem test of the Dakota between 6,730-38 ft., total depth, more than a month ago. On testing the well developed water, and finally swabbed at the rate of 60 bbl. of oil and 120 bbl. of water in 24 hours. Bay's second well in the area at 1 Goodson-Smith, C NE SE 14-44n-66w, is now being abandoned at approximately 7,200 ft., total depth, after logging only slight stains in the Newcastle and Dakota sands, and no saturation in the Sundance. Sundance was topped at 6,888 ft. Several other wildcats are scheduled to be drilled in this general area west of Mush Creek pool.

The California Co. has recovered fish and is reported drilling ahead at its important wildcat test in south-central Utah. The well is 1 Unit, C SW SW 12-36s-1e, in the Upper Valley on Escalante area of Garfield County. At 7,997 ft., total depth, the operator has been fishing drill pipe for the past month. This well has been a tight hole below the top of the Coconino (Pennsylvanian) at 6,155 ft. It was reported that some staining was encountered in the Kaibab below 6,041 ft., but that this zone tested water. Staining has also been encountered in the Coconino, but not sufficiently for commercial production. This wildcat is located on a large unitized block, and California has done a great deal of geological work in the area. The well is scheduled to be drilled to around 10,000 ft. before completion.

At Longs Creek, southeast of Sand Draw field in Fremont County, British-American Oil Producing Co. is now drilling below 6,276 ft. at 1 Government, C NW NE 5-31n-94w, and having troubles with lost circulation. Top of the Amsden was found at 6,150 ft. and Darwin sand at 6,220 ft. On drill-stem test 6,221-59 ft. the well made 750 ft. of fluid and lost circulation material, and 4,080 ft. of water and muddy water with slight sulfur odor and film of dead oil in 33 minutes. Flowing pressure was 2,500 lb. This well made water in the Ten-

sleep but may prove commercial in the Embar formation. It is the first deep test to be drilled in this area, and drilling will be continued to the Madison formation.

General Petroleum Corp.'s wildcat test of the Van Tassell area, in Wyoming, at 45-32-P, NE NE SW 32-30n-60w, Goshen County, is now reported drilling below 6,502 ft., and apparently is a failure in the Pennsylvanian sands. The well showed fresh water on drill-stem test of the Leo, although some staining was encountered in the sand. Top of the Minnekahta was logged at 5,860 ft. This well was located following extensive seismic work in the area.

At Carter Oil Co.'s Vernal Unit wildcat, Uintah County, Utah, Gamma-ray log has been run and further zones perforated without success. The zone between 7,074-76 ft. was perforated with 12 holes and on drill-stem test the well made 3,330 ft. of slightly gas-cut water with a small amount of black oil on top. The casing was perforated with 24 holes at 7,072 ft. and on drill-stem test 7,072-78 ft. the well made 3,150 ft. of slightly gas-cut water and 90 ft. of oil in 12 hours. Tubing was run and the well swabbed dry in 6 hours, and remained dry. The operator is now waiting on jet perforator to shoot the section. This is Carter's fourth well in this area, and sands in the top of the Wasatch between 7,070-7,100 ft. had indicated possible commercial gas and oil production.

New locations.—A total of 34 new locations were made, with 18 of the wells in Wyoming, 12 in Montana, 3 in Colorado and one in Utah. In Wyoming several interesting wildcats were announced including two in the Wind River Basin, two in the Powder River Basin and one in the Big Horn Basin. Southern Production, Inc., of Shreveport, and George G. Travis of Tulsa have let contract to Cook Drilling Co. of Fort Worth for a deep test of Glasner Dome, west of Dutton Basin, in Fremont County. The well at 1 Unit, C NW NE 36-34n-91w, will be drilled to 7,000 ft. At Powder River E. R. McElroy has made location for 3 LaFleiche, SW NW NE 25-36n-85w, for a shallow test of this structure. British-American and Superior Oil Co. have announced location for a second well in the Alkali Creek area at 1 Reed, C NW NW 28-40n-62w, in Niobrara County. This well will test the Newcastle (Muddy) sand at around 5,000 ft. In Washakie County, on the east side of the Big Horn Basin, Morton and Woodward have made location in the SE NE NW 8-48n-90w, for a test of the Nowood structure. Delta Drilling Co. and Continental Oil Co. are moving in materials for a 6,500-ft. Dakota-Lakota test at 1 David Nolan, SW NW NW 24-47n-66w, Weston County, north of the Lodgepole area. This will be Delta's first operation in the Rocky Mountains. Just across the line in Big Horn County, Montana, Shell Oil Co. has announced location for a 10,000-ft. Madison test at 1 Crow Tribal, NE NE NE 36-9s-37e, in the Ash Creek area. This well is on the northwest side of Powder River Basin, 25 miles northwest of a 10,088-ft. dry hole drilled by Union Oil Co. a year ago on the Badger Creek structure, Sheridan County, Wyoming. Equity et al of Salt Lake City have made location for a Weber test on the Ashley Valley structure, northwest of Rangely field, in Uinta County, Utah. The well will be 1 Ashley Valley, C SW NW 23-5s-22e, and Kerr-McGee is contractor.

Completions.—Sixteen wells were completed during the week with a total daily initial of 2,378 bbl. of oil. Eight of the wells were in Wyoming, four in Montana, three in Colorado, and one in northern New Mexico. In Wyoming Continental completed its first deep test on the Gebo structure as an Embar formation producer after failing to find production below that horizon. The well topped Gallatin at 6,585 ft., and Madison, topped at 5,435 ft., carried water. Some small saturation was logged in the Tensleep, but failed to be commercial. At Bridge Creek, Pacific Western abandoned 1 Grimes-State after finding water in the Minnelusa (Pennsylvanian) formation. The well was drilled to 5,329 ft., total depth, and topped Pahasapa at 5,190 ft. Humble Oil & Refining Co. abandoned 1 Navajo in the Todilto Park area, McKinley County, after finding Ignacio quartzite at 2,449 ft. The well was drilled to 2,474 ft., total depth, and no shows were reported.

WYOMING WILDCAT FAILURES

Bamforth Lakes, Albany County: Suhr-Trickett & Fiedler 1 Johnson, C SW SW 15-16n-74w, 1,100 TD, susp. indef.

Bridge Creek, Niobrara County: Pacific Western 1 Grimes-State, SE SW NW 16-39n-61w, 5,329 TD, abnd., Niobrara 460, Carlisle 1,310, Greenhorn 1,530, Belle Forche 1,627, Lakota 2,665, Morrison 2,795, Sundance 3,000, Spearfish 3,360, Minnekahta 3,855, Minnelusa 3,975, Red Marker 4,398, 1st Leo 4,430, Pahasapa 5,190. Elev. 3,858 KB.

COLORADO WILDCAT FAILURE

South Skull Creek, Moffat County: Empire Corp. 1 Goff, C NW SE 2-3n-101w, 1,290 TD, suspended indefinitely. Frontier 67, Dakota 690, Morrison 891, wtr. 1,025.

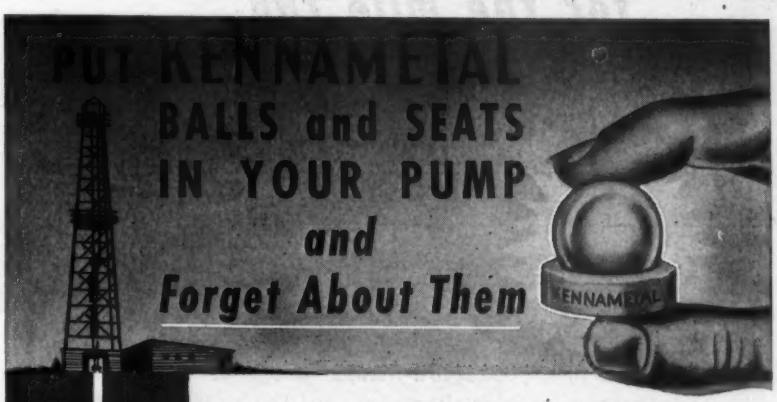
NORTHERN NEW MEXICO WILDCAT FAILURE

Todilto Park, McKinley County: Humble O. & R. 1 Navajo, CNL NE NW 27-20n-20w (NMPM), 2,474 TD, abnd., Ignacio quartzite 2,449.

N. CENTRAL TEXAS

New Caddo Production Seen in Wichita County

WICHITA FALLS.—New Caddo production was in prospect 2 miles southwest of Taylor Corner in Wichita County, at Consolidated Oil Co. 3 Alice Daves, wildcat test in Block 14 League 2, Denton Coun-



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And when brine as well as sand comes up with the oil, here, also, Kennametal prevents trouble. It resists the corrosive effect of chemical elements common to many oil fields.

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Kennametal balls and seats far outlast the normal maintenance cycle because of remarkable durability. By their use production is sustained, idle pumping time reduced, and repair expense minimized.

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Kennametal balls and seats are made in A.P.I. standard types and sizes to fit any make of pump. Prices will be quoted upon request.

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WRITE FOR LITERATURE—OSHKOSH MOTOR TRUCK, INC., OSHKOSH, WISCONSIN

ty School lands. The Caddo was topped at 5,182 ft., and drilled saturation from 5,184-98 ft. A 1-hour drill-stem test from 5,184-96 ft. brought gas to the top in 23 minutes, and recovered 150 ft. of clean oil plus 60 ft. of heavily oil-cut mud. Bottom-hole pressure gaged 2,125 psi. after shut in 15 minutes. The test is attracting interest inasmuch as it represents a new producing horizon for that section of the county. Casing was being run to 5,183 ft. for further testing.

In southwestern Wise County, 3 miles south of Cottondale, Signal Oil & Gas Co. and Loffland Brothers Drilling Co. 1 Daly reported a show of gas in dolomite of unidentified age. A core from 6,515-22 ft. recovered 1 ft. of slightly porous dolomite, with no shows. However, a 57-minute drill-stem test from 6,505-22 ft. brought gas to the surface in 4 minutes, estimated as high as 500,000 cu. ft. daily. Total recovery was 25 ft. of mud, cut with distillate. No water was reported. Identification of the formation was pending further coring and analysis of samples.

In southwestern Throckmorton County, Woodley Petroleum Co. 1 J. E. Hughes, Block 902, TE&L Survey, has extended Mississippi lime production 1½ miles southwest of the Odell field. On completion tests, the well flowed 128 bbl. of 41°-gravity oil in 9 hours. Top of the lime was 4,534 ft., with total depth at 4,550 ft.

Four miles west of the Record field, Grisham-Hunter 5 R. A. Brown, Block 1,613, TE&L Survey, completed a fifth attempt to run a drill-stem test, due to leaks in the drill pipe. A 1½-hour test was made from 4,057-61 ft., which recovered 35 ft. of drilling mud cut with oil. Operators believed the sand had been mudded off during previous attempts, and were to test further when new drill pipe arrived.

New exploratory work in North Texas included a 5,500-ft. wildcat some 3 miles northwest of Pottsboro in Grayson County. According to report, it is to be drilled by A. Z. Phillips, Shawnee, Okla., as the 1 Mrs. H. E. Chiles, 330 ft. from north and 1,980 ft. from west lines of the W. B. Chiles Survey. Skelly Oil Co. is said to be supporting the venture.

In Wise County, 3 miles southwest of Bridgeport, Neeld & Hood Drilling Co. plan to drill a shallow test 1,030 ft. from north and 530 ft. from west lines of Section 27, Matagorda CSL. Location is 800 ft. southeast of a 4,070-ft. dry hole.

Republic Natural Gas Co. 1 Lorena Kinder, located about 4½ miles northeast of Windthorst in Archer County, is to be a 4,600-ft. rotary test. Location is 330 ft. from south and west lines of Lot 3, Block 2, Clark & Plumb subdivision.

Eight miles southwest of Windthorst, Consolidated Oil Co. staked location for its B-2 J. L. Prideaux, a 3,200-ft. rotary test 330 ft. from north and west lines of the SA&MG Survey.

In the new Refinery area 1½ miles northwest of Wichita Falls, Continental Oil Co. 1 Martha C. Tyson, W. Harvey Survey, was drilling ahead below 4,690 ft. in shale. It topped the KMA sand at 4,485 ft., and drilled to 4,496 ft. where a drill-stem test was run. With the tool open 1 hour, recovery was 25 ft. of slightly oil-cut mud, with no water.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Brown County: Lion Oil & Refining Co. 1 A. J. Newton, Blk. 7, R. Honeycutt Sur. 623, 1½ mi. W. Thristy, dry, TD 2,341 ft., Caddo 1,964 ft., Ranger 2,295 ft., limestone 2,328-35 ft. tested 50 bbl. fluid first hour, 60 per cent oil, balance water, casing collapsed around 2,296 ft.

Callahan County: McCarty & Coleman 1 Young, Sec. 3, BBB&CRR Sur., 5 mi. S Clyde, dry, TD 1,604 ft.

Star Oil Co. 2 M. E. Fry, Blk. 5, SPRR Sur., 5 mi. S Putnam, dry, TD 623 ft. in shale.

Star Oil Co. 1 H. E. Jones, Sec. 21, BBB-&CRR Sur., 2½ mi. SE Eula, dry, TD 2,349 ft., Dotham lime 1,215 ft., sand with oil show 1,817-20 ft.

Taylor County: West Central Drilling Co. 1 Chapman, League 120, Guadalupe CSL, 2 mi. W View, dry, TD 2,935 ft., Flippen 2,414 ft., Reef 2,860 ft.

MICHIGAN

31 New Locations Are Planned in Michigan

SAGINAW. — Thirty-one new locations, largest number for any week this year, were listed for oil and gas operations in the past week as completions numbered 21, resulting in 8 oil wells, 2 gas wells, 11 dry holes. Eight of the failures were wildcats.

Three of the producers are in Allegan County and one each in Arenac, Bay, Gladwin, Missaukee, and Oceana. The best is a 500-bbl. well in Oceana's Weare Township (Pentwater field). Total initial potential was 860 bbl. a day.

Thirteen counties share in planned new development, Oceana being listed for six new locations, Allegan, Crawford and Van Buren for four each, Mason for three, Mecosta and Gladwin for two, and Midland, Berrien, Muskegon, Ogemaw, Osceola and St. Joseph each for one.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: P. K. Degenther 1 William Radke, SE SW NW 31-2n-13w, dry in Traverse limestone, TD 1,373 ft.

Salem Township: Ford Oil Co. 1 George Klomp, NW SW SW 6-4n-13w, dry in Traverse limestone, TD 1,643 ft.

Arenac County, Moffat Township: William B. Stewart and Basin Oil Co. 1 State-Moffatt, NE NE SW 28-20n-3e, dry in Dundee, TD 3,152 ft.

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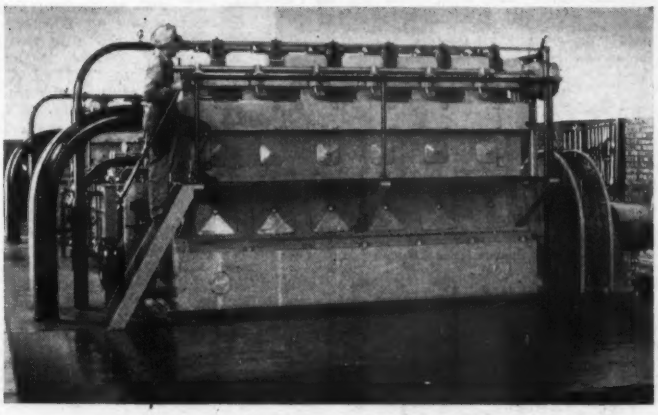

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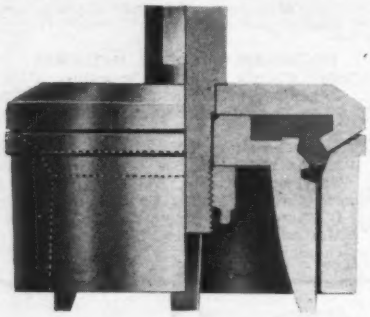

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Barry County, Orangeville Township: R. B. Tamblyn Development Co. 1 John Jennings, NW NE SW 8-2n-10w, dry in Traverse limestone, TD 1,835 ft.

Kalamazoo County, Alamo Township: Winfield D. Gannett 1 P. Allison, SE SE SE 31-1s-12w, dry in Traverse limestone, TD 1,348 ft.

Montcalm County, Belvidere Township: Chapman Oil Co. 1 Emanuel Otzman, NE NW NE 20-12n-7w, dry in Detriot River, TD 3,559 ft.

Van Buren County, Decatur Township: Mercer Oil Co., Inc., 1 Becker, SE SE NW 22-4s-14w, dry in Traverse limestone, TD 1,007 ft.

Bangor Township: Stuart L. Godfrey 1 Thomas and Grace Newnum, NW SE SE 14-2s-16w, dry in Traverse limestone, TD 1,008 ft.

OKLAHOMA

Okfuskee County Wildcat Makes 50 Bbl. per Hour

MID-CONTINENT PETROLEUM CORP. has a new pool opener at 1 Holderby, SE NE SW 29-13n-10e, Okfuskee County. Production is from Gilcrease sand at 2,910-26½ ft. After the plug was drilled and the well was washed in, it flowed to pits for 2 hours and then tanked 27 bbl. in 30 minutes. On an early drill-stem test of the pay, the recovery was 1,800 ft. of oil. In a full 24-hour test the well made 384 bbl. through various chokes. The name of Haydenville South has been assigned to the pool opened by the well.

Continental Oil Co. and Magnolia Petroleum Co. 1 W. D. Dunn, NW SW SW 10-5n-2w, McClain County, had a show of oil in the Hunton on drill-stem test. Operator has run casing for further test. The top of the Hunton was called at 7,222 ft. and the Bois d'Arc section at 7,294 ft. Total depth is 7,309 ft. The drill-stem test at 7,222-7,309 ft. recovered 100 ft. of oil-cut mud. The well also had a show of oil in the fourth Deese sand on a drill-stem test made at 7,022-48 ft.

Sinclair Prairie Oil Co. is adding another producer at the southwest tip of South Ceres pool in Noble County. The well, 4 Steichen, SE NW NW 3-22n-1w, had good cores of Bartlesville sand and drilled to a total depth of 4,566 ft. Casing was set at 4,449 ft.

Deardorf Oil Corp. has completed 1 Howell, SW NE SE 14-17n-3e, Payne County, as a gas well with production estimated at 5,000,000 cu. ft. per day. Production is from the Bartlesville topped at 3,923 ft. The hole was cased to a total depth of 3,969 ft. and production is through perforations to cut off water found at the bottom of the pay.

OKLAHOMA SUCCESSFUL WILDCAT

Logan County: Jordan Petroleum 1 Faver, SE SE SE 8-15n-1e, flowed 500 bbl. of oil from Bartlesville sand, TD 5,092 ft., deepening of East Evansville field discovery of May 1948, OTD 5,018 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Moulton & Gladney 1 Strange, SW NW 32-1n-11w, dry, TD 2,246 ft., no tops reported.

Garvin County: Alberding et al 1 Schorn, SE NE NE 31-2n-1e, dry, TD 5,385 ft., Deese 4,227 ft., sand 4,245 ft., basal Pennsylvanian-Viola 4,323 ft., Trenton 4,540 ft., bromide 4,820 ft.

Grady County: The Texas Co. 1 Chapman Ranch, NE NE SE 26-4n-6w, dry, TD 10,173 ft., Deese 6,485 ft., sand 6,715 ft. and 9,310 ft.

Greer County: Dillard 1 Clark, NE NE SE 28-4n-22w, dry, TD 4,842 ft., no tops reported.

Okfuskee County: Buell 1 Lasley, SE NE NE 3-12n-7e, dry, TD 3,852 ft., Oswego 2,660 ft., Prue 2,670 ft., Skinner 2,738 ft., Gilcrease 3,724 ft., Cromwell 3,757-90 ft., Caney 3,833 ft.

Oklahoma County: Amerada 1 Whitehead, C SE SE 2-11n-1w, dry, TD 6,682 ft., Oswego 5,710 ft., Verdigris 5,795 ft., Skinner 5,818 ft., Hunton 6,009 ft., Sylvan 6,219 ft., Viola 6,319 ft., dolomite 6,397 ft., first Wilcox 6,503 ft., second Wilcox 6,628 ft.

Harper & Turner 1 Lapham, NW NW SW 1-14n-3w, dry, TD 6,235 ft., Pawhuska 3,008 ft., Hogshooter 5,080 ft., Oswego 5,715 ft., Bartlesville 5,950 ft., Mississippian 5,980 ft., Woodford 5,999 ft., Hunton 6,035 ft., Sylvan 6,150 ft.

Stephens County: Peppers 1 Meil, SW SE NW 27-1n-4w, dry, TD 5,988 ft., Springer 4,985 ft., sand 5,335 ft. and 5,388 ft., oolitic lime 5,651 ft., sand 5,743 ft.

ILLINOIS

Wabash County Area Gets New Pay

MATTOON.—In the area just north of Lexington pool in Wabash County, Phillips Petroleum Co. and N. V. Duncan have a new pay for the area at 2 Keepes-Pfeister Comm., NE SW NE 24-1s-14w. A 22-minute drill-stem test of the O'Hara at 2,835-42 ft. had gas in 4 minutes and flowed clean oil in 13 minutes. Operator has set casing at 2,833 ft. for further tests. Production in Lexington pool is from the McClosky at about 2,970 ft.

One of the best wells in the recently opened Silurian pay in McKinley pool, Washington County, is W. C. McBride 1 John Ahlers, SE NW NE 29-3s-4w. On last report, the well was flowing 700 bbl. of oil per day from Silurian pay at 2,254-72 ft. The Silurian pay for the pool was opened in July by McBride 1 Hunleth, SE NE NW 29-3s-4w, with an initial production of 225 bbl. per day.

In Jasper County, J. L. Black is cleaning out after acid treatment at 1 J. R. Wattlesworth, SW NW NE 12-7n-10e. Well swabbed 10 bbl. of oil per hour from McClosky at 2,399-2,414 ft. Casing was set at 2,395 ft.

Kingwood Oil Co. has completed a good well in Roland pool in White County. The well, 1 M. H. Shook, SW NW NW 1-7s-8e, flowed 350 bbl. per day from the McClosky at 3,029-37 ft. Total depth was 3,136 ft.

ILLINOIS SUCCESSFUL WILDCAT

Wabash County: C. E. Skiles 1 Herbert Goff, SW SE SW 21-1s-13w, IP 104 bbl., Benoist sand, 2,607-17 ft., TD 2,622 ft.

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ILLINOIS WILDCAT FAILURES

Effingham County: E. A. Obering 1 Pickens, SW SW SW 14-7n-7e, dry, TD 2,912 ft.

Clay County: R. P. Johnson 1 Gibbs, SE SW NE 21-3n-8e, dry, TD 3,104 ft.

Clark County: G. Roy Phillips 1 L. Erwin, SW NE SE 35-11n-14w, dry, TD 389 ft.

Madison County: Turner & Johnson 1 Aherns, SW NE SW 13-6n-7w, dry, TD 550 ft.

A. J. Hausmann 1 Knackstedt, NE SW NW 25-6n-7w, dry, TD 550 ft.

Clinton County: J. D. Finley 1 M. Aldas, SE SE SE 11-2n-2w, dry, TD 1,373 ft.

Franklin County: J. W. Rudy 1 Vaber Coal Co., SW NE NE 11-6s-1e, dry, TD 2,793 ft.

Gallatin County: O. B. Mitchell et al 1 Shawneetown Bank, NW SW SW 31-8s-11e, dry, TD 2,800 ft.

B. Henman 1 O. H. McNeil, NE SE SE 10-9s-10e, dry, TD 2,834 ft.

Perry County: N. A. Cummins 1 A. Eater, SE NE SE 10-4s-1w, dry, TD 1,462 ft.

OHIO, KENTUCKY

Jackson Township Gets Dry Gas Well

COLUMBUS.—Beasley & Lynn moved a mile east of oil production in Jackson Township, Muskingum County, and struck a dry gas well on M. J. Bryan in Lot 18. Clinton sand was found at 3,242-97 ft. with 920,000 cu. ft. natural.

The Everett Co. 2 W. W. Arnold, Section 7, Reading Township, Perry County, showed 6 bbl. and 400,000 cu. ft. natural, and 101 bbl. and 750,000 cu. ft. in 24 hours after a 100-qt. shot. The well is 1,000 ft. west of the No. 1, a small producer. In Pleasant Township, the Ohio Fuel 1 D. H. Bishop, Section 21, has been drilled through the Clinton with 1,010,000 cu. ft. natural, and is being drilled on down to the Medina sand. The Clinton sand came in at 3,844-84 ft.

The Permian Oil & Gas Co. completed the 2 Carl Benus, Section 22, Noble Township, Noble County, at a depth of 1,445 ft. The well tested 440,000 cu. ft. of gas from 12½-ft. pay interval in the Berea sand. Rock pressure was 485 psi. This is the fourth and best well to date drilled by the company in the area.

Two good wells were completed in Clayton Township, Perry County. The Quaker State Oil 5 Jas. Adrian, Section 11, logged the Clinton at 3,372-3,441 ft. with a good show of oil. After a 140-qt. shot, the well made 95 bbl. in 24 hours. In Section 4, the Preston Oil 2 Jos. Shiplett made 50 bbl. the first day after shot from Clinton at 3,301-51 ft.

A high, for recent years, of 52 wells was completed for the week. Athens and Meigs counties in Stewart field accounted for 19, all shallow wells drilled for oil. Cambridge field had 7 completions and Ashland and Brush Creek 6 each. Locations for the week totaled 27 from 9 counties. Athens led with 11 and was followed by Perry with 6, and Cuyahoga with 4.

EASTERN KENTUCKY

ASHLAND.—In Jackson County, 25-L-66, Dyer, Patterson and Roeder 1 N. V. Bond is drilling at 4,230 ft. in the Knox formation, topped at 2,920 ft. A reported showing of gas at 4,195 ft. was tested but with negative results. Due to small hole and hard abrasive character of rock, operators are now making hole very slowly.

In Clark County, 1½ miles southeast of Winchester, Sam Allen et al are preparing to run casing in Knox dolomite at 1,650 ft. Top of formation was logged at 860 ft. with water present. Casing is being run to test lower sands.

In northern Powell County, 4-Q-68, Roy Davis et al 1 George Reddix was drilling ahead at 2,650 ft. Previously St. Peter sand was topped at 1,945 ft. and Knox dolomite at 2,000 ft. No commercial shows present to date.

Location has been staked for a new wildcat test in Estill County. Spot is 19-O-67, just north of Ravenna. It will be drilled by Elmer Dyer et al and will test the Knox dolomite.

No wildcat completions were recorded for the week.

WESTERN KENTUCKY

OWENSBORO.—I. B. Browning 1 Low Moisture Coal Co., SE SW SE 15-L-22, Webster County, is drilling below 2,656 ft. in the McClosky. A 1-hour drill-stem test of the Cypress at 2,307-25 ft. recovered 300 ft. of gas and 90 ft. of gas and oil-cut mud.

Delta Drilling Co. 1 Mrs. J. F. Haleman, NE SW SW 21-M-22, Webster County, is drilling below 2,531 ft. after coring shale and hard sand with a show of oil in the Tar Springs at 2,501-09 ft. The well is important in that it will help evaluate the O'Hara pay in the area. The Dixon pool was opened by Shelton et al 1 Ramsey, SE NE SW 21-M-22, but the initial production from the O'Hara was less than was expected following good recovery on drill-stem tests. It was thought probable that part of the pay had been sealed off when the casing was set, and the completion of 1 Haleman will furnish further information on the pay zone.

Guy Parris 1 Sherrill Heirs, SE NE NW 18-Q-20, Henderson County wildcat, is drilling below 1,867 ft. after a 1-hour drill-stem test of the Waltersburg at 1,849-59 ft. recovered drilling mud with only slight oil odor.

INDIANA

EVANSVILLE.—The area around Owensville in Gibson County continues in the limelight as George S. Engle tests Waltersburg sand at 1 John Teel, SE SW NW 16-3s-

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11w. Operator is installing pump for test of pay at 1,684-1,703 ft. after swabbing 160 bbl. of oil in 24 hours. The well is about 2 miles southeast of Owensville. Engle 1 Mason, NE NW SW of the same section, is down to 1,706 ft. and operator is running drill-stem test of Waltersburg.

F. B. Cline continues testing the Devonian at H. A. Seipman, SW NE SW 30-9n-8w, Sullivan County. Production is now estimated at 100 bbl. of oil and 300 bbl. of water daily through ⅛-in. choke. Cline is drilling below 920 ft. at 1 Margaret N. Pittman, SW SW NE of the same section.

Gilliam Drilling Co. has completed 1 Henry Spilker, SE SW NW 12-5s-11w, about 4 miles northwest of Vanderburgh pool in Vanderburgh County. Initial production was 180 bbl. daily from the McGlosky at 2,456-62 ft. following 1,000-gal. acid treatment.

Olen D. Sharp has completed 4 Berry et al, SE NW NW 13-2s-13w, with an initial production of 600 bbl. per day from Waltersburg sand at 1,922-66 ft. This well is in Rochester pool that was opened in June by Sharp 1 Berry with an initial production of 842 bbl. per day from the Waltersburg.

INDIANA WILDCAT FAILURES

Posey County: Superior Oil Co. 1 E. Miendering, SW SE SW 14-4s-12w, dry, TD 2,960 ft.

Vanderburgh County: W. C. McBride 1 Aloys Heerdink, NE SE SE 7-6s-10w, dry, TD 2,438 ft.

CANADIAN FIELDS

Leduc Wild Well Declines Gradually

CHATHAM.—Atlantic 3 wild well in the Leduc field is still out of control, producing 8,000 to 9,000 bbl. daily and gradually declining from the high of 14,000 bbl. several weeks ago. Its July deliveries were 312,912 bbl., of which 252,912 bbl. were marketed by the Alberta Conservation Board and 59,616 bbl. returned to Atlantic 1 and 2 wells. Production of the well up to the end of July was 865,732 bbl., the marketed production representing a value of $2,026,000 approximately. The west relief well, a directionally drilled hole 700 ft. from No. 3, halted at 5,255 ft. to run casing, preparatory to flooding No. 3. The south relief well developed trouble at 5,222 ft. and is fishing for drill pipe twisted off at 3,700 ft.

South and west of the field, Continental 8, LSD 11, 7-26-50w4, finished at 5,187 ft. and on initial tests flowed 1,800 bbl. daily from D-2 zone with 2-in. tubing, until available storage was filled. It will operate on temporary conservation board allotment of 80 bbl. daily. The location, 2 miles west of south-end production and 1 mile south of the proven western extremity of the field, opens about 2,000 acres for drilling.

Imperial 79, LSD 1, 10-50-26w4, at 5,421 ft. flowed oil in 20 minutes on drill-stem test. Imperial 81, LSD 16, 4-50-26w4, at 5,412 ft. got a heavy gas flow followed by oil. It is well to the south of the field. Imperial 58, LSD 13, 2-50-26w4, still farther south, at 5,407 ft. has initial potential of 1,200 bbl. Imperial 77, LSD 3, 34-50-26w4, at 5,310 ft. had 2,582 bbl. potential.

Imperial wildcats.—Two new exploratory tests, both northwest of Edmonton, are being started by Imperial Oil. Imperial-Dapp 1 has location in LSD 5, 29-62-1w5, some 80 miles northwest of Edmonton. Imperial-Mearns 1 has been spotted in LSD 15, 6-56-26w4, 18 miles northwest of Edmonton. Some 8 miles southeast of the latter, Imperial-Volmer 1, LSD 2, 16-55-25w4, drilled to 7,272 ft., has plugged back and is reported making 20 bbl. of 29°-gravity crude from the lower Cretaceous. Imperial-Clyde 1, LSD 9, 29-59-24w4, to the north and east, has been been abandoned at 7,527 ft.

Provost.—Joint operations are being started in the Provost area, south and west of the Lloydminster field, by Trifield Petroleums, Mallon-Red Lake Gold and Dougron Gold, all of Toronto. Location for No. 1 well is in LSD 16, 17-41-3w4, near Highwood-Dina 1 producer. Some 2 years ago drilling by Imperial Oil secured a small Cretaceous production in the Provost area.

Quebec.—Quebec Oil Devolpment, Ltd., recently incorporated with head office at Montreal, is planning to drill two wells in the Montreal area.

Lloydminster.—In the Alberta section of the Lloydminster field, Commercial Oil 1, LSD 11, 14-50-2w4, finished at 1,976 ft., has initial production of 65 bbl. C. L. 10, LSD 13, 16-50-1w4, at 1,948 ft., has 40 bbl. Petromine 1, LSD 2, 14-50-2w4, at 1,975 ft., has 50 bbl. and Petromine 2, LSD 2, 14-50-2w4, has 55 bbl. daily. Superior 13, LSD 15, 14-50-2w4, finished at 1,967 ft., is being placed on the pump. Paradise 1-11-11, LSD 11, 11-48-2w4, an outpost test to the south, has been abandoned at 2,452 ft. Rose-Leduc 1, LSD 13, 20-52-3w4, testing a potential extension to the northwest, finished drilling at 2,071 ft. and has plugged back to test showings at 1,942 ft.

EASTERN TEXAS

Saturated Cores Taken From Delta Wildcat

DALLAS.—Delta Drilling Co. 4 L. H. Livingston, new wildcat operation in the Nacogdoches University Survey, A-703, cored 1 ft. of sand saturated with black oil, 1 ft. of sandy lime slightly saturated, and 2 more feet of saturated sand, between 3,989-99 ft. Operators then ran a 30-minute dill-stem test with packer set at 3,973 ft., and total depth at 3,999 ft., which produced a strong blow at the surface and recovered 90 ft. of mud cut with heavy black oil, plus 480 ft. of heavy black oil cut with gas. There was no water. Flowing bottom-hole pressure was 250 psi., and 1,580 psi. shut in. The section tested was identified as the sub-Clarksville, topped at 3,958 ft., with the main sand at 3,988 ft., on an elevation of 449 ft. It continued drilling below 4,185 ft.

Delta Drilling Co. et al 1 H. W. Wilson, 2¼ miles south of Sulphur Bluff, had total depth at 8,085 ft. in sand and shale. Drill pipe was stuck at 3,500 ft.

In Smith County, Humble Oil & Refining Co. 1 Sackett cored no shows in hard, dense oolitic limestone, from 10,460-73 ft., but prepared to make a drill-stem test of the interval. Humble 1 Wintters was drilling below 8,775 ft. in lime and shale.

In Wood County, Phillips Petroleum Co. 1 Shearer had total depth at 5,232 ft. in sand and shale and stopped to run electrical log. It was to take side-wall cores.

Kaufman County's first commercial oil field received a second test this week at Thomas D. Humphrey and Humble Oil & Refining Co. 1 E. N. Rylie, 4 miles southeast of Kemp. It is about a 1-mile southwest offset to the discovery well, 1 Tuggle, which completed as a pumping well from the Bacon limestone at 6,106-16 and 6,132-42 ft., averaging around 40 bbl. of oil a day. The 1 Rylie is in the northeast corner of a 62½-acre tract in the northwest section of the G. Y'Barbo Survey. Like the discovery, it will probably test all zones to the Travis Peak.

In Madison County, Sun Oil Co. 1-A Day, Crownover Survey, just west of Madisonville, was coring ahead below 2,097 ft. A core at 2,084-91 ft. recovered shale with sand streaks having oil shows. Earlier cores at 2,072-84 ft. recovered sand with oil shows. A 1-hour drill-stem test of the interval recovered 20 ft. of oil-cut mud, 40 ft. of mud and 1,230 ft. o fwater.

Humble Oil & Refining Co. 1 McWatters, deep Freestone County test, was drilling ahead below 16,255 ft. in shale and lime, with no further information available. Current reports are that it might establish a depth record for the state.

EAST TEXAS (DISTRICTS 5 & 6) SUCCESSFUL WILDCAT

Hopkins County: Shell Oil Co., Inc., 1 J. L. Hedrick, George B. Halyard Sur., 6 mi. SE Sulphur Bluff, pumped 118.8 bbl. of 14°-gravity oil a day, perforated Paluxy sand 4,500-06, 4,525-50 ft., TD 4,800 ft.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURES

Navarro County: L. T. Davis 1 Mrs. Etta Black, D. R. Mitchell Sur., 3½ mi. NE Powell, dry, TD 3,305 ft., Austin 2,567-2,916 ft. by samples.

E. E. Hoffpauir 1 Mrs. Goldie Thomas, John McNeal Sur., 1 mi. SW Angus, dry, TD 1,800 ft.

KANSAS

Reno County Wildcat Has Good Viola Show

NEAR the southeastern corner of Reno County, Phillips Petroleum Co. and Magnolia Petroleum Co. have set casing at 1 Eck, SE NE SE 31-26s-4w, for tests of the Viola. The Viola was topped at 4,023 ft. and a 30-minute drill-stem test at 4,020-27 ft. recovered 200 ft. of oil after gas showed in 25 minutes. The well is located a little more than 4 miles southwest of Hilger pool where production is also from the Viola.

Alpine Oil & Royalty Co. has set casing for a test at 1 Bryant, NW SW NE 27-20s-12w, Barton County. Tops reported were: Heebner at 3,009 ft., Brown lime at 3,133 ft., Lansing at 3,151 ft., and Arbuckle at 3,383 ft. Operator reported a show of oil at 3,168-76 ft. The well is 1 mile northeast of the one-well Workman pool.

National Cooperative Refinery Association and S. B. Smith have set casing at 1 Smith, SE SE SW 8-9s-18w, Rooks County, to test shows in the Arbuckle. Casing was set at 3,492 ft., 1 ft. in the Arbuckle, and well drilled to 3,496 ft.

Cities Service Oil Co. continues testing at 1 Krueger, SE SE SE 35-10s-16w, Rooks County wildcat. On latest reported pump test, well made 191 bbl. of oil and 22 bbl. of water in 14 hours from the Lansing topped at 3,255 ft. Hole was carried to 3,682 ft. in the Arbuckle but found water at that zone.

For the week, a total of 52 new locations were reported. The state was led by Barton County with seven. Stafford County accounted for six and Butler and Rooks counties reported five each.

KANSAS SUCCESSFUL WILDCAT

Russell County: El Dorado Refining 1 Meier, SE SE NW 30-15s-12w, swabbed potential of 252 bbl. per day from Arbuckle; anhydrite 816 ft., Topeka 2,708 ft., Heebner 2,965 ft., lime 3,050 ft., conglomerate 3,318 ft., Arbuckle 3,325 ft.

KANSAS WILDCAT FAILURES

Barton County: Derby Oil et al 2 Simmons, NE NE SW 2-18s-11w, dry, TD 3,360 ft., lime 3,072 ft., conglomerate 3,322 ft.

Mid Plains et al 1 Roesler, NW NW NW 24-18s-11w, dry, TD 3,315 ft., Arbuckle 3,307 ft.

Ellis County: Holl & Allen 1 Chrisler, SE SE SE 32-11s-16w, dry, TD 3,448 ft., Topeka 2,758 ft., lime 3,057 ft., Arbuckle 3,436 ft.

Heathman & Honaker 1 Schmeidler, NE NE NE 25-12s-18w, dry, TD 3,770 ft., anhydrite 1,385 ft., lime 3,483 ft., conglomerate 3,687 ft., Simpson 3,735 ft., Arbuckle 3,751 ft.

Adair 1 Weber, NE NE SW 33-13s-17w, dry, TD 3,610 ft., Heebner 3,175 ft., lime 3,325 ft., conglomerate 3,561 ft., Simpson 3,575 ft., Arbuckle 3,582 ft.

Hanlon & Boyle 1 Emery, SW SW NE 24-14s-18w, dry TD 3,677 ft., anhydrite 1,183 ft., Topeka 2,973 ft., conglomerate 3,510 ft., Arbuckle 3,630 ft.

Osborne County: Westgate-Greenland 2 Spear, SW SE NW 15-8s-14w, dry, TD 3,162 ft.

Rice County: Williams et al 1 Cherpitle, NW NE SW 8-20s-8w, dry, TD 3,450 ft.

D. T. Ingling 1 Rice, NW NW SW 21-21s-7w, dry, TD 3,424 ft.

Rush County: Westgate-Greenland et al 1 Hartung, SW SW NW 29-17s-16w, dry, TD 3,586 ft., granite wash 3,559 ft.

Stafford County: Musgrove et al 1 Spangenberg, NW NW SE 16-22s-12w, dry, TD 3,695 ft., Heebner 3,155 ft., Viola 3,567 ft., Simpson 3,628 ft., Arbuckle 3,686 ft.

LA.-ARK.

Claiborne Parish Deep Test Has More Shows

SHREVEPORT. — M. A. Halsey et al 1 Bishop-Lewis "Unit," 30-20n-6w, deep test in Athens field of Claiborne Parish, had further shows of gas and distillate in drilling to 7,542 ft. A drill-stem test between 7,521-42 ft., using ¼-in. chokes, and open 2 hours, recovered 90 ft. of mud cut with gas and distillate. Operators ran electrical log to 7,411 ft., then continued drilling below 7,651 ft. It is projected to 10,000 ft.

One mile southeast of East Haynesville, Hunt Oil Co. 1 Goodwin, 21-23n-7w, was drilling in the Cotton Valley below 8,160 ft. Sample tops released were: Tuscaloosa 3,380 ft., Glen Rose 3,467 ft., massive anhydrite 3,960 ft., and the Kilpatrick 4,175 ft. Elevation is 270 ft.

In Madison Parish, C. A. Kinard 1 Singer, 15-15n-10e, was again shut down for high water at 5,921 ft., in the Paluxy. Cores from 5,908-21 ft. recovered 13 ft. of sand and shale, with no shows. Electric log tops reported were: Midway 4,129 ft., gas rock 4,594 ft., Austin 4,792 ft., Eagleford 5,004 ft., and the Tuscaloosa at 5,204 ft.

Victor P. Grage 1 W. D. Ambrose, in irregular section 10-5n-6w, 15 miles southwest of Colfax, Natchitoches Parish, completed for 93 bbl. of oil in 16 hours through 7/64-in. tubing choke, from perforations at 5,788-91 ft. in the Wilcox. Gravity of the oil was 44.8°; shakeout was slightly more than 1 per cent. New field name is Gorum.

In Ouachita Parish, The California Co. 2 Breece Lumber Co. had total depth at 9,454 ft. in the Cotton Valley and was running electrical surveys. Top on the "D" sand was 9,188-9,422 ft. The same company's 2 Maxey, 32-18n-1e, had total depth at 9,581 ft. and prepared to perforate after coring sand with slight gas odor between 9,508-9,556 ft. Tops logged were: "D" sand 9,296-9,334 ft., Bodcaw 9,402-36 ft., sand 9,472-86 ft., and the Vaughn 9,508-43 ft.

In Webster Parish, Stanolind and Continental 1 Viola Mitchell Unit, 31-23n-9w, ran a 40-minute drill-stem test from 10,358-10,400 ft. Recovery was 3,000 ft. of water cushion, 3,600 ft. of gas-cut water, 200 ft. of gas-cut salty mud and 3,700 ft. of salt water. Bottom-hole flowing pressure was 3,200 psi.

Arkansas wildcat operations were active during the week. In Cleveland County, De-Sha Basin Corp. 1 E. A. Merrill, 13-9s-9w, was drilling in the Meekin sand at 4,040 ft. Stanolind 1 Bodcaw, 29-19s-23w, Lafayette County, was in the Cotton Valley at 8,062 ft. Stanolind 1 Union Saw Mill, 18-19s-24w, was still in the lower Glen Rose at 5,659 ft. K. E. Merren 1 Phelps, 6-13s-31w, Little River County, had total depth at 1,500 ft. in the Paluxy and was waiting on orders after running survey. W. L. Pickens 1 Almond, 16-13s-22w, Nevada County, was drilling the Buckner at 3,875 ft. Tide Water-Seaboard 1 Mitchell, 16-14s-21w, was in the lower Glen Rose below 2,980 ft. McAlester Fuel Co. 1-A Howe Lumber, 27-3s-2e, Phillips County, was thought to be in the Nacatoch at 3,998 ft. In Union County, Carter Oil Co. 1 Ethredge, 20-19s-16w, was in the Travis Peak at 6,038 ft.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Natchitoches Parish: Victor P. Grage 1 Ambrose, 10-5n-6w, flowed 93 bbl. 44.8°-gravity oil a day, 7/64-in. choke, flowing tubing pressure 415 psi., casing 650 psi., GOR 333 cu. ft., pay in Wilcox 5,788-91 ft., TD 6,802 ft., elev. 256 ft.

NORTH LOUISIANA WILDCAT FAILURES

Red River Parish: G. M. LeGrande 1 E. P. Lee, 11-14n-12w, dry, TD 1,737 ft.

Sabine Parish: Hassie Hunt 1 Whitney Corp., SE NW 19-10n-13w, dry, TD 6,724 ft., no tops reported.

ARKANSAS WILDCAT FAILURE

Clark County: H. T. Ross et al 1 fee, SW NW NW 32-10s-20w, dry, TD 1,659 ft., Nacatoch 336 ft., Saratoga 573 ft., Tokio 1,036 ft., Travis Peak 1,142 ft., Smackover 1,404 ft., Eagle Mills 1,622 ft.

Miller County: Placid Oil Co. 1 Alex Smith, 32-17s-28w, dry, TD 4,911 ft., Paluxy 3,86$ ft., sand 4,470-4,610 ft., elev. 210 ft.

Ouachita County: Jack Carnes 1 Smith, SE SW SW 19-13s-17w, dry, TD 2,260 ft.

Permits for Offshore Work Asked by Three Oil Firms

HOUSTON. — Kerr-McGee Oil Industries, Inc., and Magnolia Petroleum Co. have applied to the Department of the Army Engineers in New Orleans for permits to conduct drilling operations in the Gulf of Mexico.

Kerr-McGee proposed work in an area about 8 miles southwest of Grand Chenier in Cameron Parish, Louisiana. Magnolia requested a permit for operations about 53 miles southwest of Morgan City in St. Mary Parish. A permit for seismograph exploration work authorizing the necessary temporary construction was asked by Superior Oil Co. of California for an area about 129,300 ft. by 120,300 ft. central to a point about 40 miles southwest from Leeville in Terrebonne Parish.

Average Prices Determined For Panhandle Field Gas

AUSTIN. — The Texas Railroad Commission has determined the current average well-head price of sweet gas sold in Panhandle field for light and fuel purposes to be the equivalent of 3.80543 cents per 1,000 cu. ft., and the average price of sour gas equivalent to 3.35878 cents per 1,000 cu. ft.

These findings were the second determination made of Panhandle field gas prices under an act of the last legislature which requires the commission to hold hearings annually or semiannually and then to announce average market prices. Findings of the commission are for gas measured under standard conditions of 14.65 psi. and 60° F.

Under the law Panhandle field gas from certain wells may be used for carbon-black manufacture without prior extraction of natural-gasoline content provided it is used in a plant with an average recovery of not less than 1½ lb. per 1,000 cu. ft. and that the royalty rate and well-head price paid for the gas equals that paid in the immediate area for gas used for light and fuel purposes. In its price determination, the commission is allowed to make not more than a ½-cent reduction for purification costs of sour gas.

Military Aviation Needs Met; Motor Gasoline Short

WASHINGTON.—Armed Services Petroleum Board officials reported last week that military requirements for 100/130 aviation gasoline for the remainder of the year have now been met by the industry, but there is still a shortage of more than 500,000 bbl. of motor gasoline.

Present commitments for aviation gasoline are sufficient to meet the originally planned operations plus the additional 2,000,000 bbl. necessitated by the Berlin airlift.

A shortage of 1,700,000 bbl. of motor gasoline last month was the basis of the military's strident "or else" ultimatum, when they threatened to invoke the mandatory-order provisions of the Selective Service Act, which brought prompt action from the companies. Most of the deficit was quickly taken up, but difficulties are being experienced in getting the last 500,000 bbl. at prices in what the ASPB considers the range it should pay.

Court Stops Fireworks at Nueces Gasoline Plant

CORPUS CHRISTI.—Agua Dulce Corp. has been granted a temporary injunction against 10 individuals prohibiting "unlawful conduct" in connection with picketing of the company's Nueces County natural-gasoline plant.

Earlier, the state District Court had issued a temporary restraining order against the Oil Workers International Union, a business agent, and 20 members, after the company in a petition contended the union members had threatened employes, tossed firecrackers near volatile storage containers, and blocked the plant entrance from employes and customers.

The 40,000-gal. daily capacity plant was struck May 31 and when subsequent negotiations failed the company employed a new staff and resumed operations July 18.

In granting the temporary injunction, the court held that the defendants' picketing had "not been peaceful."

STATISTICS and T

WEEKLY WELL COMPLETIONS . . WEEK ENDED AUGUST 14, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	27	13	0	*14	31,419	959	963	0	0	0	0	0	0	0	0	0	0
Pennsylvania	46	21	2	†23	73,416	1,643	1,796	0	0	0	0	0	0	0	9	13	22
West Virginia	13	2	9	2	34,163	484	517	0	0	0	0	0	3	0	32	35	70
Ohio	52	26	13	13	120,216	845	809	0	0	0	1	1	2	0	9	20	31
Indiana	20	14	0	6	36,293	633	390	0	0	0	2	2	16	0	1	26	43
Kentucky	15	4	3	8	28,371	426	408	0	0	0	0	0	7	0	0	12	19
Illinois	39	12	0	27	97,475	1,404	1,243	1	0	0	10	11	30	0	1	213	244
Michigan	21	8	2	11	44,782	494	519	0	0	0	8	8	13	0	8	164	185
Kansas	57	25	6	†26	184,159	1,875	1,595	1	0	0	11	12	36	0	4	262	302
Neb., Mo., Iowa	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	2	2
Oklahoma	82	41	7	34	342,243	2,502	2,533	1	0	0	8	9	79	7	18	400	504
Texas	253	167	8	78	1,073,124	7,202	5,573	4	2	3	36	45	205	20	64	1,249	1,538
North Central (Dist. 7-B & 9)	74	40	1	33	241,820	2,237	1,813	0	0	0	5	5	71	0	10	438	519
West (Dist. 7-C & 8)	64	58	1	5	297,051	1,960	1,332	1	0	0	5	6	44	0	2	140	186
Panhandle (Dist. 10)	15	14	1	0	47,672	388	286	0	0	0	0	0	0	0	2	6	8
Eastern (Dist. 5 & 6)	11	7	2	2	54,046	338	315	1	0	0	1	2	8	2	0	70	80
Gulf Coast (Dist. 2 & 3)	38	22	2	14	216,239	1,135	974	2	1	2	6	11	52	15	18	274	359
Southwest (Dist. 1 & 4)	51	26	1	24	216,296	1,144	873	0	1	1	19	21	30	3	32	321	386
Louisiana	45	31	3	11	207,366	1,380	857	1	1	0	5	7	29	18	3	130	180
Northern	32	23	3	6	80,999	917	480	1	0	0	3	4	3	1	0	65	69
Southern	13	8	0	5	126,367	463	377	0	1	0	2	3	26	17	3	65	111
Arkansas	4	1	0	3	15,181	175	164	0	0	0	3	3	5	0	0	55	60
Mississippi	7	3	0	4	58,876	246	300	0	0	0	3	3	2	1	3	53	59
Southeastern States	0	0	0	0	0	31	37	0	0	0	0	0	0	0	0	29	29
Montana	4	2	0	2	11,452	164	160	0	0	0	0	0	3	0	0	11	14
Wyoming	8	4	0	4	43,689	292	137	0	0	0	2	2	18	0	1	30	49
Colorado-Utah	3	2	0	1	14,217	151	126	0	0	0	1	1	0	0	4	31	35
New Mexico	15	11	0	4	60,384	383	327	0	0	0	2	2	4	1	1	32	38
California	59	44	1	14	224,907	1,782	1,212	2	0	1	11	14	73	0	4	185	262
Total United States	770	431	54	285	2,701,733	23,074	19,670	10	3	4	103	120	525	47	162	2,952	3,686
Total previous week	835	471	64	300	2,955,420	22,304	18,948	25	2	4	114	145	515	44	158	2,849	3,566
Total August 16, 1947	722	382	82	258	2,430,118			16	3	5	83	107	420	50	129	2,429	3,028

Service wells included: *14, †1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED AUGUST 7

District—	Crude runs, daily avg.	(Thousands of barrels) Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	897	2,377	271	1,222	1,755	23,558	9,478	18,319	11,505
Appalachian:									
District 1	96	319	38	108	83	1,897	404	623	399
District 2	28	87	13	29	70	832	87	207	145
Ind., Ill., Ky.	964	3,483	399	872	1,123	20,570	3,878	9,083	5,532
Okla., Kans., Mo.	470	1,642	115	722	539	8,262	1,343	4,638	2,022
Inland Texas	221	998	81	174	401	3,251	854	744	852
Texas Gulf Coast	1,409	4,162	711	2,295	1,906	15,073	2,135	7,425	7,118
La. Gulf Coast	396	1,340	322	589	449	5,014	1,514	3,891	1,623
N. La. and Ark.	68	172	39	77	113	2,353	477	462	279
Rocky Mountain:									
New Mexico	12	43	7	12	28	77	25	28	36
Other Rocky Mt.	152	415	25	189	242	2,084	252	1,133	922
California	871	2,631	105	755	2,272	14,867	852	13,072	36,478
August 7, 1948	5,584	17,669	2,126	7,044	8,981	97,838	21,299	59,625	66,911
July 31, 1948	5,718	17,646	2,213	6,823	9,080	99,116	21,051	56,661	65,713
August 9, 1947	5,239	16,507	1,985	6,047	8,675	85,656	18,636	47,935	53,644

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 220,255,000 bbl. as of August 7—down 2,882,000 bbl. One year ago 227,779,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

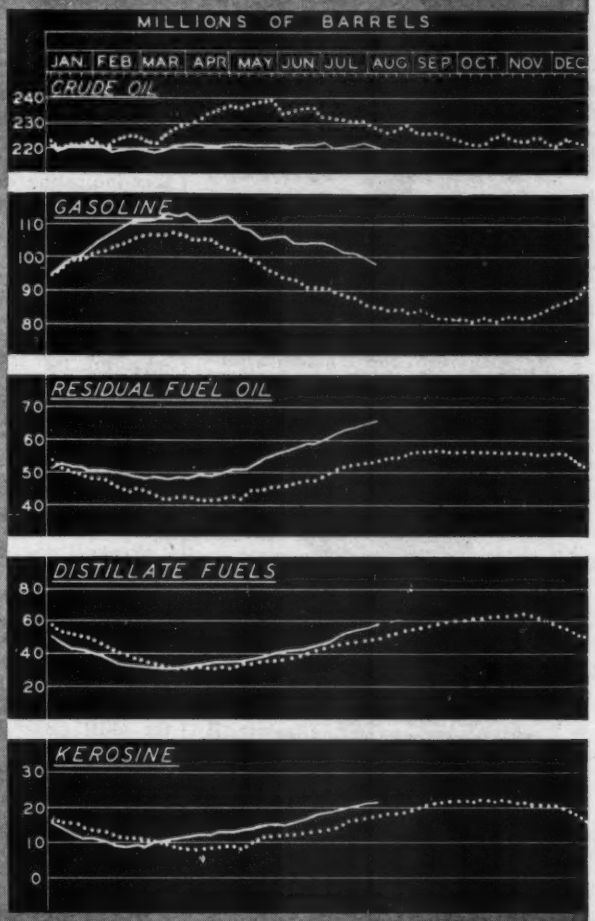
	Aug. 14 crude oil	B. of M. Aug. demand	Aug. 7 crude oil
Alabama	1,375	1,300	1,350
Arkansas	81,225	90,000	81,875
California	949,800	955,000	950,600
Colorado	46,640	50,000	45,370
Eastern	66,200	66,200	66,900
Florida	850	800	850
Illinois	178,300	170,000	179,300
Indiana	19,400	16,000	23,900
Kansas	301,350	306,000	290,800
Kentucky	24,000	25,000	25,300
Louisiana	482,300	500,000	482,850
North Louisiana	113,100	.....	113,650
South Louisiana	369,200	.....	369,200
Michigan	44,900	46,000	45,450
Mississippi	123,925	130,000	125,935
Montana	25,300	27,000	24,600
Nebraska	400	700	400
New Mexico	132,960	138,000	132,960
Oklahoma	424,250	438,000	427,950
Texas	2,446,600	2,540,000	2,446,600
Dist. 1 (Southwest)	29,005	.....	29,005
Dist. 2 (Southwest)	178,900	.....	178,900
Dist. 4 (Southwest)	250,375	.....	250,375
Dist. 3 (Gulf Coast)	493,420	.....	493,420
Dist. 5 (Eastern)	49,575	.....	49,575
Dist. 6 (Eastern)	120,000	.....	120,000
East Texas Field	304,000	.....	304,000
Dist. 7-C (West)	43,600	.....	43,600
Dist. 8 (West)	703,050	.....	703,050
Dist. 7-B (W. Central)	50,725	.....	50,725
Dist. 9 (N. Central)	137,850	.....	137,850
Dist. 10 (Panhandle)	86,100	.....	86,100
Wyoming	151,560	160,000	150,740
Total United States	*5,501,335	5,660,000	5,503,730
Change from prev. wk., dn.	2,395		

Total production January 1-August 14 .. †1,242,884,660 bbl.
Same period last year (crude plus cond.) 1,120,746,885 bbl.

*Not incl. 72,960 bbl. condensate. †Incl. 16,854,475 bbl. condensate.

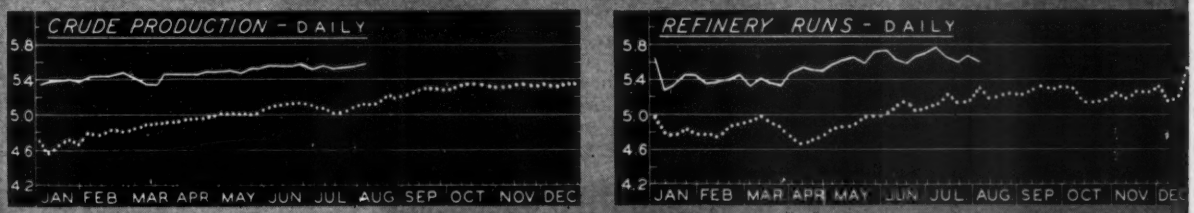
STOCKS IN UNITED STATES

---- 1947 ——— 1948



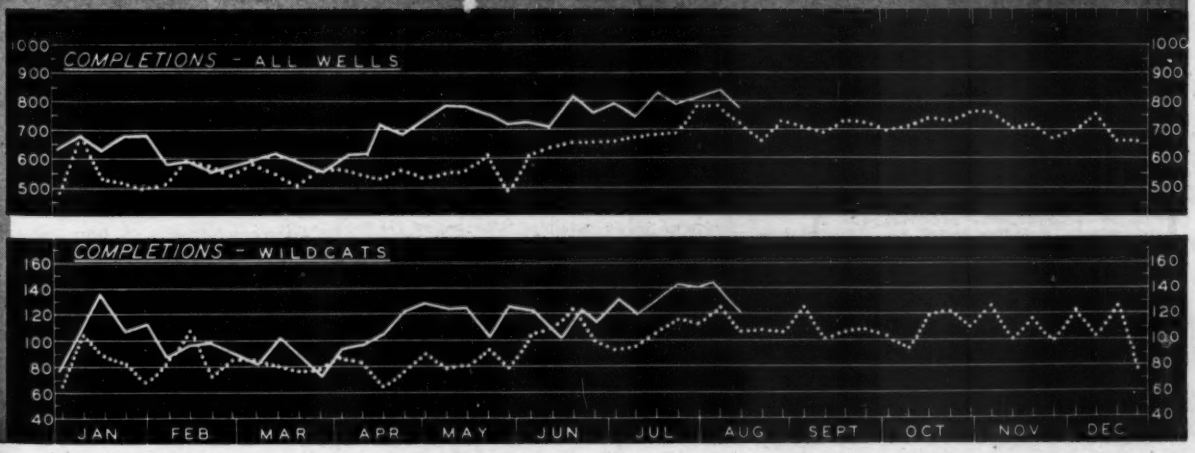
DAILY OPERATIONS

---- 1947 ——— 1948



WEEKLY COMPLETIONS

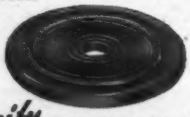
---- 1947 ——— 1948



With a PATTERSON-BALLAGH TUBING WIPER

Wipes tubing dry so that the rig, hoist and tools are kept clean. Rugged steel housing bolts to flange type head on bolt centers 9" to 16"—designed to take heaviest tubing loads...Special Rubber Wiper is steel reinforced to make center wiping web resilient yet firm, durable, and long lasting—wipes miles of tubing dry.

Send for Catalog 180 or check your Supply Store.



Specify PROTECTION PROVEN

PATTERSON-BALLAGH

DIVISION OF BYRON JACKSON CO

TUBING WIPERS

Main Office: P. O. Box 2493, Terminal Annex, Los Angeles 54

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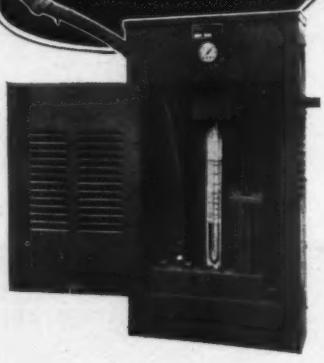
Paddock CHLORINATORS

CAPACITIES UP TO 2000 LBS. PER 24 HRS.



FOR ALGAE AND SLIME CONTROL

Operates on high vacuum — no moving parts. Only 6 ft. installation space. Sturdy cabinet permits outdoor installations. Available in 8 capacities — 15 lbs. to 2000 lbs. of chlorine per 24 hours. Ideal for chlorinating drinking water.

Paddock Sales of Texas

Sales Agent for Paddock Engineering Company of Texas
3727 Atwell St. Dallas 9, Texas • M & M Bldg. Houston 2, Texas

MARKETS

THE spot market continued sluggish on the Gulf Coast last week with the price of most products except light heating oils pointing downward.

Marketers were concerned over further indications that the bullish trend of prices has been reversed by marked improvement in supply. Most major companies were reported to have abandoned allocation systems in the East and Midwest, though still not actively seeking new business.

Marketing officials were closely watching for effects of military and Marshall Plan buying. But generally, the industry's all-out production efforts appeared to have caused a reduction in paying premium prices for material.

No. 6 Continues Weak

Weakest item was still No. 6 heavy fuel oil. Reports were that some large companies had asked that the Government take more residual fuel oil, but were told requirements for this product had been filled. Regular-grade motor fuel was reported moving at about 11 cents, tank car, in the Gulf Coast area. Much kerosine and No. 2 were moving to storage or taken as cracking stock. Little was evident on the open market.

Spot-market trading in all petroleum products in the Mid-Continent area continued firm with the exception of No. 6, which was moving at prices down "around the $2 mark," according to some suppliers. However, price levels generally remained unchanged. One Oklahoma refiner reported some increase in inquiries for distillates and that demand for No. 2 burning oil showed a definite increase over the previous week. Most of this material was moving at 9¼ to 9⅝ cents per gallon and much of it was going to storage.

Gasoline demand continued firm and with prices remaining in a comfortable range. Group 3 price level for this material was "around 11 cents." One supplier reported that he had obtained several cars of house-brand gasoline, f.o.b. Oklahoma, for 10¾ cents per gallon.

Many marketers last week had a favorable outlook in viewing the coming winter season and felt that the industry would be able to meet consumer needs for burning oils as it is now meeting gasoline demand.

Natural-gasoline demand continued strong. One large supplier in the Mid-Continent area dropped his spot tank-car price f.o.b. Group 3 for 130-132 A.S.T.M. crude scale wax from 6¾ to 6¼ cents per pound.

New York Trading Quiet

In New York Harbor spot-market trading last week was for the most part quiet. Inquiries for light heating oils were light, it was reported, and according to some observers indicated high stock levels. Asking price for No. 2 in most cases was 10.5 barges. Some marketers reported "low" bids which they said was an attempt to "inject a weak tone to the market" for this material.

Harbor prices ranged from about $3 to $3.57, barges. According to one report one cargo of Mexican heavy fuel was offered at $2.95 and went unsold. However, quotations for petroleum products along the Eastern Seaboard remained generally unchanged.

Gasoline consumption in New York state for the first half of the year indicated an increase of 8 per cent, according to the state's Miscellaneous Tax Bureau.

Representative Quotations

Representative spot-market quotations of leading suppliers as of August 16, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-11	11.6-12* 10.5-11.9†	10.9-12
Premium gasoline, 78-80 octane	11½-12	10.6-13.4	12.9-13¼
42-44 w.w. kerosine	9½-10	10.3-11.9	10¼-10½
No. 2 straw fuel oil	9-9¼	9.4-10.9	9.05-10
No. 6 residual	$2.15-2.50	$3.03-3.57	$2.20-2.65

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-21

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	30-33
200 vis. No. 3 neutral, 0-10 pp.	20-21

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	6¼-6½

EQUIPMENT MEN ... in the News

McKinney Named Executive Vice President

A. W. McKINNEY

Arthur W. McKinney of Toledo, vice president and general manager of sales of National Supply Co., has been elected to the newly created position of executive vice president of the company.

McKinney joined National Supply as a salesman in 1920 shortly after his discharge from the Army, in which he served as a lieutenant in the Signal Corps. He rose through various sales positions to become vice president and general manager of sales in 1940.

A specialist in petroleum problems, McKinney held advisory positions in that field during World War II, serving as a member of Industry Advisory Council, Petroleum Administration for War; and member of Materials Subcommittee, Petroleum Industry War Council.

McKinney is a director of the American Petroleum Institute and was recently appointed a member of the National Petroleum Council by J. A. Krug, Secretary of the Interior. A few weeks ago he was elected president of the Petroleum Equipment Suppliers Association. He is a director of National Supply Co., Oil Well Engineering Co., Ltd., Cheadle Heath, England; and Ohio Citizens Trust Co., Toledo.

Personnel Changes In Acid Engineering

Acid Engineering Co. of Kansas announces the following personnel changes.

W. D. Ash is now station manager of Lakin, Kans., station, with Leslie G. Stullken, office manager; L. L. Wait, treating engineer; K. W. Clawson, maintenance supervisor; Harry Ochs, mechanic and compressor operator; Carl Drake, assistant mechanic; and Leatherman and McRae, drivers.

Houston Steel Firm Construction Begins

Already expanding to meet the light-steel construction needs of South Texas, McRan Co., Houston, has started work on its fabricating plant and warehouses on Hempstead Highway, northwest of Houston.

Meanwhile, the firm is rapidly increasing its sales and service facilities throughout the progressive South Texas area, according to a company spokesman.

Officers of McRan Co., which is franchised by Great Lakes Steel Corp., are John F. McComb, president; Henry E. Randle, vice president; Adolph Stuermer, secretary, and W. F. Weed, treasurer.

Bill Swisher recently has been named sales manager of the company.

Ideco Appoints New Advertising Manager

H. L. "Bob" Cunningham, Oklahoma City advertising executive, has recently joined the sales headquarters of International Derrick & Equipment Co., Dallas. Prior to joining the Ideco group, Bob represented an industrial advertising agency in Oklahoma City, handling oil-field-equipment advertising for manufacturers in Oklahoma, Texas, and New Mexico.

Hunt Tool Announces Southwest Expansion

Greatly expanded machine-shop and field-service facilities for Southwest Texas and Mexico have been included by Hunt Tool Co. in a recently completed expansion program at the Corpus Christi plant.

The enlarged Hunt Tool Co. plant at Corpus Christi is the largest repair shop in Southwest Texas. With additional machinery and welding equipment which has been installed at the new plant, Hunt is equipped to completely overhaul and repair complete drilling rigs and other drilling and production machinery.

A fleet of field welding trucks and boiler-repair trucks have been added to the field service facilities. In addition, complete fishing-tool and sidewall-coring services have been established at the Corpus Christi plant.

R. H. King is division manager.

Loudenback Transferred To Dallas

R. LOUDENBACK

Tom Ramey, sales manager of Unit Rig & Equipment Co., has announced the transfer of Ray Loudenback to office in Dallas, where he will represent the company in Louisiana, Mississippi, Texas, and New Mexico.

Loudenback is well known to the drilling fraternity in the Mid-Continent field, having covered the area the past 17 years in the capacity of sales and service engineer.

Ter Bush Named Assistant Sales Manager

Martin L. Ter Bush, Jr., has been appointed assistant sales manager for United States Safety Service Co. with general offices in Kansas City, Mo.

Ter Bush was formerly branch manager of the United States Safety Service office in Detroit. He has had considerable experience in accident prevention and the safety-equipment field.

Stiles Appointed Core Lab Sales Manager

W. E. (Bill) Stiles, former Gulf Coast division manager in Houston for Core Laboratories, Inc., recently has been promoted to manager of sales for that organization.

Stiles, a graduate petroleum engineer from Texas A. & M. College, was employed by Core Lab in 1942 as a field engineer specializing in field testing work. During the past 6 years he has held positions as reservoir engineer in the engineering department and as division engineer of the North Texas division. Prior to his association with Core Lab, he was engaged in coring equipment sales and service and subsurface engineering work.

In his new capacity Stiles will direct the company's entire domestic

and foreign sales program from the general office in Dallas.

Hovis Establishes Tulsa Office

W. H. Hovis of Houston has established a Tulsa sales office to represent Brown Well Service Co. and Brown Oil Tools, Inc., in Oklahoma and Kansas. Present offices are at 1425 South Quincy Avenue, Tulsa.

Brown Well Service handles a variety of products for the petroleum industry, including those manufactured by Brown Oil Tools, Inc., at factories in Houston and Odessa, Tex. Brown Well Service supply stores presently are maintained in Houston, Corpus Christi, Victoria, Lake Charles, Houma, and Longview. Both are Houston firms.

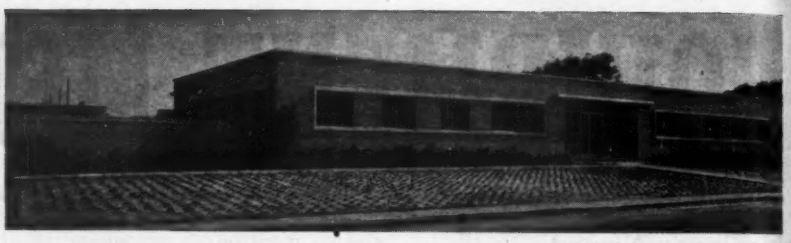
In 1935, Hovis formed Brown-Hovis Co. in Houston. Three years later the company was divided into the present Brown companies, at which time Hovis took over all Brown Well Service accounts for Texas, Louisiana, and Mississippi.

Palmer Named General Manager

Appointment of Arthur B. Palmer as general manager of Sperry-Sun Well Surveying Co. is announced by Samuel H. Williston, vice president and director.

Palmer joined the parent Sun Oil Co. as an engineer at Maracaibo, Venezuela, in 1922, immediately after his graduation from University of Illinois where he received a degree in civil engineering.

He joined Sperry-Sun as a sales and service engineer in 1929. In 1938 he was named district manager for the company and since August 1947 he has served as general sales manager with headquarters at Houston.



New Delta Engineering Corp. building at 2121 San Felipe Road, Houston

Delta Engineering To New Location

Delta Engineering Corp. recently moved into its new office building located at 2121 San Felipe Road, adjoining River Oaks, Houston's exclusive residential area.

The new building is of modern American architecture, functionally designed to meet the company's specific requirements. The entire structure, comprising an area of approximately 6,000 sq. ft., is provided with year around air conditioning. Construction is of structural steel and masonry throughout with an exterior finish of Mexican handmade brick and Colorado limestone. The basic structure is designed to accommodate a second floor to provide for future expansion.

Delta Engineering Corp. is engaged in the design and construction of natural-gas-processing facilities for the oil and gas industry. Officers of the corporation are Robert B. Baldwin, president; George L. Gudenrath and Allen R. Salley, vice presidents; and W. J. Geiselman, secretary-treasurer.

Goulds Pumps Celebrates 100 Years

Goulds Pumps, Inc., Seneca Falls, N. Y., is celebrating its centennial anniversary this year.

In 1848 Seneca Falls was making flour and grist-mill machinery, clocks, farming implements, and pumps. The first all-metal pump in the world was cast by 20 employes headed by Seabury S. Gould in 1850. Shortly after this time Gould decided to manufacture pumps exclusively and formed Goulds Pumps, Inc., in 1926.

Since that time the Gould family has handed down the pump-building tradition until today it can boast the world's largest pump plant with 402,500 sq. ft. of floor space.

Bethlehem Supply Appoints Seger Treasurer

C. SEGER, JR.

The appointment of Christian Seger, Jr., as treasurer of Bethlehem Supply Co. is announced by G. A. Thompson, president. Seger succeeds A. W. Tarkington who has resigned to join Continental Oil Co.

Seger comes to Bethlehem Supply Co. with nearly 20 years of experience in credits and finance and a family background in banking. His father, a former Tulsa bank officer, and present independent oil operator, moved his family to Tulsa from Illinois in 1916.

After graduating from Central High School in Tulsa, Seger attended University of Illinois from which he was graduated in 1930. Immediately thereafter he was employed by National Bank of Tulsa as a clerk in the credit department, from which position he was advanced to the rank of assistant cashier and placed in charge of the department. Later he served as head of the personal-loan department.

He left the bank in 1938 to take the position of credit manager of Bethlehem Supply. He served the company in this capacity for 3 years and then was promoted to resident manager at Houston.

With the outbreak of war, Seger was commissioned in the U. S. Navy and 2 years of his service were spent with the Naval Forces in the South Pacific theater. He was released to inactive duty in October 1945 with the rank of lieutenant commander. Upon his discharge from the service, he was elected vice president of National Bank of Tulsa and served as an officer in the commercial-loan department.

Members of Weatherford Spring Co., Weatherford, Tex., who had a part in the manufacture of the first scratcher made by the company, met for the first time in 13 years recently in Los Angeles. The first scratcher was invented by Jess E. Hall, Sr., in 1934. Scratchers were first used in Weed Patch oil field near Bakersfield in 1935. Those at the reunion were: Jess E. Hall, Sr., George Hall, Clay Miller, Ralph Hall (no family relation to Jess Hall), Art Brumbly, Roy Swearinger, and Carl Parks

Knight Named Sales Manager

A. H. KNIGHT

The appointment of A. H. Knight as sales manager of the Franks Manufacturing Corp. of Tulsa is announced by R. M. White, vice president in charge of sales.

Knight has spent more than 10 years with major supply stores and has had considerable field experience since becoming identified with the petroleum industry in 1929. He was with Oil Well Supply Co. for 8 years and was with International Derrick & Equipment Co. 1½ years.

Knight will have his headquarters at Franks' main office in Tulsa.

Mountain Iron & Supply Appoints McClellan

Mountain Iron & Supply Co. announces appointment of Fleet L. McClellan as sales manager. McClellan has been associated with Mountain Iron & Supply for the past 13 years during which time he served alternately as store manager at McPherson, Russell, and Chase, Kans. In 1916 he was named field superintendent for the company's five stores in Kansas.

McClellan, who will office in Wichita, succeeds R. B. Adair, resigned.

Stentz Expands to Gulf Coast

Stentz Equipment Co., Tulsa, has recently expanded operations to include the Gulf Coast. Division offices have been established in the Shell Building, Houston. This new office will be an addition to Stentz Equipment Co. offices at Dallas, and Wichita.

William S. Binning, manager of the new Gulf Coast division, was formerly president of International Engine Corp., Dallas. During the war he served on the staff of Headquarters Army Air Forces as technical executive for ground equipment. His wide experience in the Mid-Continent and West Coast areas include 4 years with Amerada Petroleum Corp.

Stentz Equipment Co. manufactures the well-known SECO automatic tank shutoff valve, and the automatic engine shutdown switch. In addition, Stentz serves as direct factory representative, in the Mid-Continent and Gulf Coast areas, for Marlow Pumps and the industrial division of National Radiator Co. Marlow is the world's largest manufacturer of self-priming centrifugal pumps, while National Radiator is an outstanding manufacturer of cast-iron condensing and cooling sections, heat-transfer equipment, and direct-fired emulsion heaters for sour crude oils.

Bagley Named Store Manager

Continental Supply Co., Dallas, has announced the appointment of W. O. Bagley, Jr., as manager of the Ellinwood, Kans., store. Bagley has been serving at the same point as field manager. He succeeds A. M. Rouse who resigned recently.

Oliver United Filters Names Reed

Oliver United Filters, Inc., with general sales headquarters in New York City, announces the appointment of Glen G. Reed to handle petroleum sales in its eastern and central divisions. Reed, formerly with Dicalite Co. as manager of the St. Louis and New Orleans sales divisions, became associated with Oliver United Filters in May 1947 and has had wide experience in petroleum and other fields.

Monsanto Names McCammond and Zack

Appointment of Donald B. McCammond of Pembroke, Mass., as assistant to the director of industrial and public relations, Monsanto Chemical Co., has been announced.

At the same time, James G. Zack, divisional director of public relations for Monsanto's plastics division at Springfield, Mass., has been transferred to St. Louis headquarters of the company. Zack will supervise industrial relations publications for the department. Prior to his assignment with the plastics division of Monsanto, Zack was employed on the staff of the Springfield Republican and Daily News.

In his new assignment, McCammond will supervise eastern operations of the department. He will have direct charge of activities of the company's public relations offices in Boston, Springfield, and New York.

Two Appointments At Oil Base, Inc.

G. G. BAKER

The appointments of Gerald G. Baker as research chemist and Thomas B. Heck as service engineer have been announced by George Miller, president of Oil Base, Inc. Baker will act as a liaison between field engineers and the laboratory on field problems, as well as testing and developing the company's new products. He will be stationed at the home office laboratory at Compton, Calif.

Heck will cover the Texas and Louisiana territories out of the Houston office. He is well acquainted with drilling problems in the Gulf Coast, having previously served as production engineer for Visco and Baroid Sales.

Everett Becomes Vice President

William S. Everett has acquired an interest in and has become vice president of A. R. Flournoy Co., Los Angeles, distributor of heat-transfer and engine equipment. A. R. Flournoy is president of the company.

Everett is a graduate of California Institute of Technology and later obtained his M.S. in mechanical engineering at University of California. For the past 2½ years he has been Los Angeles district manager for Enterprise Engine & Foundry Co. Prior to the war Everett was employed in the engineering department of one of the major West Coast oil companies. He served during the war in the Navy as a machinery inspector with the rank of lieutenant commander.

National Tube Appoints Mason

L. W. MASON

Louis W. Mason has been appointed assistant to the general manager of sales of National Tube Co., it is announced by H. J. Wallace, general manager of sales. Mason has been Pittsburgh district manager of sales for the company.

Succeeding Mason as manager of National Tube's Pittsburgh sales office is Henry C. Hoar, formerly manager of sales at St. Louis.

Glendon P. Robb will succeed Hoar as manager of sales in St. Louis.

(Continued on page 179)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

USED Le Roi 6-, 8-, and 12-cylinder gas engines, complete and in A-1 condition for oil industry power. Priced to sell. Also one Model NKU Waukesha $1500. Write or call today. General Machine & Supply Company, P. O. Box 72, Wichita Falls, Texas.

FOR SALE

One Rotary Drilling Rig, Complete A-1 Condition, Wilson Mogul with D 13000 Caterpillar Engines 87 Feet Lee C. Moore Portable Derrick. Good 4½" Drill Pipe.

GEORGE S. ENGLE, BOX 655
EVANSVILLE, INDIANA
Phone 5-5179

FOR SALE

10—Closed heavy riveted steel tanks, approx. 55′ in diameter x 80′ high, from ¼" to ½" in thickness—APPROX. 1,400 TON—formerly used for grain storage, located at Buffalo, N. Y.

We will sell these as tanks or plates; or they can be made up to other size tanks.

19—Used (like new) horizontal welded standard 12,000 gallon gasoline storage tanks.

6—New heavy welded steel tanks, approx. 7′ 6" in diameter x 13′ 6" long, approx. 5/16" shell, ¾" bulged heads.

3—New vertical heavy welded steel tanks, approx. 4′ 8" in diameter by 18′ 8" high, bulged heads, approx. 1½" thickness throughout; with welded stands.

1—Never used horizontal welded steel tank, 11′ in diameter by 30′ long, 5/16" thickness, bulged heads.

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3,400 ft.—14" O.D. 14 gauge used spiral welded steel pipe, in 40′ lengths, grooved for Victaulic couplings.

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FRanklin 0064

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FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: 10,000 ft. New 3½" 13.30#, Internal Upset, Range 2, API Drill Pipe, complete with tool joints. Regular price. Box C-531, The Oil and Gas Journal, Tulsa, Oklahoma.

THREE New HBI 600 Cummins diesel engines, $2,650.00 each; and one new six MZRU Waukesha engine, $800.00. Subject to prior sale. Box C-548, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, Sterling Bldg., Houston, Texas. Phone Capitol 9241.

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2—125 H. P. 350# Working Pressure "Oil Well Boilers," excellent condition. Completely reconditioned. Not used since last approved by State Boiler Inspector. Priced to sell.

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Six new 1947 unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, four connected to Ingersol-Rand Multi-stage Centrifugal Pumps with Farrel-Birmingham Step-up Gears and two connected to Worthington Horizontal Triplex Double Acting Pumps, all units complete with Falk Couplings, Lummus Coolers, other accessories. Location Ohio, immediate delivery. Direct inquiries to

THE BUCKEYE PIPE LINE COMPANY
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FOR SALE: Double Drum Spudder, 6500′ Drilling and Sand Line capacity; Telescoping mast on sub base, less power. A heavy duty drilling machine, all anti-friction bearings. Box C-527, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Three Ideco Winches, practically new. Suitable for 8000′ well servicing. Terms. Melton Supply Company, Seminole, Oklahoma.

350 new 12-inch Victaulic couplings—bargain. 3—6′ x 20′ 1¼ inch shell welded storage tanks. The American Pipe & Supply Co., 3403 Brighton Blvd., Denver 5, Colorado.

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FOR SALE: Brand new 28 L Bucyrus-Erie Spudder, Caterpillar Diesel motor. Casing strut, 8.25 tires, with or without tools. Jack Read, Scottsville, Ky. Phone 385.

"Hydraulic Casing Pulling Unit complete w/ Int'l Truck, Ford Truck and Semi-Trailer — Hand tools — Supplies — Ready to go to work.

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Box C-542, The Oil and Gas Journal
Tulsa, Oklahoma

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